2024

AP® Research Academic Paper

Sample Student Responses and Scoring Commentary

Inside:

Sample E

- ☑ **Scoring Guidelines**
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Academic Paper — 5 Points

Score of 1	Score of 2	Score of 3	Score of 4	Score of 5
Report on Existing Knowledge	**Report on Existing Knowledge with Simplistic Use of a Research Method**	**Ineffectual Argument for a New Understanding**	**Well-Supported, Articulate Argument Conveying a New Understanding**	**Rich Analysis of a New Understanding Addressing a Gap in the Research Base**
• Presents an overly broad topic of inquiry.	• Presents a topic of inquiry with narrowing scope or focus, that is NOT carried through either in the method or in the overall line of reasoning.	• Carries the focus or scope of a topic of inquiry through the method **AND** overall line of reasoning, even though the focus or scope might still be narrowing.	• Focuses a topic of inquiry with clear and narrow parameters, which are addressed through the method and the conclusion.	• Focuses a topic of inquiry with clear and narrow parameters, which are addressed through the method and the conclusion.
• Situates a topic of inquiry within a single perspective derived from scholarly works **OR** through a variety of perspectives derived from mostly non-scholarly works.	• Situates a topic of inquiry within a single perspective derived from scholarly works **OR** through a variety of perspectives derived from mostly non-scholarly works.	• Situates a topic of inquiry within relevant scholarly works of varying perspectives, although connections to some works may be unclear	• Explicitly connects a topic of inquiry to relevant scholarly works of varying perspectives **AND** logically explains how the topic of inquiry addresses a gap.	• Explicitly connects a topic of inquiry to relevant scholarly works of varying perspectives **AND** logically explains how the topic of inquiry addresses a gap.
• Describes a search and report process.	• Describes a nonreplicable research method **OR** provides an oversimplified description of a method, with questionable alignment to the purpose of the inquiry.	• Describes a reasonably replicable research method, with questionable alignment to the purpose of the inquiry.	• Logically defends the alignment of a detailed, replicable research method to the purpose of the inquiry	• Logically defends the alignment of a detailed, replicable research method to the purpose of the inquiry.
• Summarizes or reports existing knowledge in the field of understanding pertaining to the topic of inquiry.	• Summarizes or reports existing knowledge in the field of understanding pertaining to the topic of inquiry.	• Conveys a new understanding or conclusion, with an underdeveloped line of reasoning **OR** insufficient evidence.	• Supports a new understanding or conclusion through a logically organized line of reasoning **AND** sufficient evidence. The limitations and/or implications, if present, of the new understanding or conclusion are oversimplified.	• Justifies a new understanding or conclusion through a logical progression of inquiry choices, sufficient evidence, explanation of the limitations of the conclusion, and an explanation of the implications to the community of practice.
• Generally communicates the student's ideas, although errors in grammar, discipline-specific style, and organization distract or confuse the reader.	• Generally communicates the student's ideas, although errors in grammar, discipline-specific style, and organization distract or confuse the reader.	• Competently communicates the student's ideas, although there may be some errors in grammar, discipline-specific style, and organization.	• Competently communicates the student's ideas, although there may be some errors in grammar, discipline-specific style, and organization.	• Enhances the communication of the student's ideas through organization, use of design elements, conventions of grammar, style, mechanics, and word precision, with few to no errors.
• Cites **AND/OR** attributes sources (in bibliography/ works cited and/or intext), with multiple errors and/or an inconsistent use of a discipline specific style.	• Cites **AND/OR** attributes sources (in bibliography/ works cited and/or intext), with multiple errors and/or an inconsistent use of a discipline specific style.	• Cites **AND** attributes sources, using a discipline-specific style (in both bibliography/works cited **AND** intext), with few errors or inconsistencies.	• Cites **AND** attributes sources, with a consistent use of an appropriate discipline-specific style (in both bibliography/works cited **AND** intext), with few to no errors.	• Cites **AND** attributes sources, with a consistent use of an appropriate discipline-specific style (in both bibliography/works cited **AND** intext), with few to no errors.

Academic Paper

Overview

This performance task was intended to assess students' ability to conduct scholarly and responsible research and develop an evidence-based argument that clearly communicates a conclusion or new understanding stemming from a clearly articulated research question or project goal. More specifically, this performance task was intended to assess students' ability to:

- Generate a focused research question that is situated within or connected to a larger scholarly context or community;
- Explore relationships between and among multiple works representing multiple perspectives within the scholarly literature related to the topic of inquiry;
- Articulate what approach, method, or process they have chosen to use to address their research question, why they have chosen that approach to answering their question, and how they employed it;
- Develop and present their own argument, conclusion, or new understanding while acknowledging its limitations and discussing its implications to a larger community of practice;
- Support their conclusion through the compilation, use, and synthesis of relevant and significant evidence generated by their research;
- Use organizational and design elements to effectively convey the paper's message;
- Consistently and accurately cite, attribute, and integrate the knowledge and work of others, while distinguishing between the student's voice and that of others;
- Generate a paper in which word choice and syntax enhance communication by adhering to established conventions of grammar, usage, and mechanics.

Agreement of Firefighters With Decontamination Policies of Their Department's

April 30, 2024

Introduction

Cancer within the firefighting service is a topic that has little information, regardless of its different aspects of it. Firefighters have an increased risk of getting life-threatening cancer developments caused by the carcinogenic chemicals in fires. These chemicals are heavily understudied among firefighters, not just with the large city full-time firefighters but also rural volunteer firefighters(Adetona et.al). When looking into firefighter decontamination, there are many different factors, such as the different gear they wear, the time exposed to chemicals, etc. While there has been research into the different chemicals in fires it is hard to learn more about the specifics since many chemicals constantly change as they combust and burn longer (Adetona et.al).

Previous research mainly focuses on the carcinogens released in fires but constantly leaves us to forget a main point in firefighter safety, decontamination. Different fire departments across the United States and even the world have many different policies relating to decontamination of their gear and themselves after entering an active fire. These policies change and warp depending on the size and severity of the fire. A large house fire will require more cleaning than a small grass burn. Firefighter gear decontamination has been proven to make a difference in cancer, especially in firefighters. Firefighters have an increase in cancer risk by up to 10% compared to the general public, but it is shown that gear decon post-fire can remove the harmful carcinogens (IAFF 2017). The purpose of this research is to fill a large gap in the previous research gathered, how can fire departments change their decontamination policies to better suit their firefighters. The research is conducted to find the answer to the question: To what extent do firefighters agree and or disagree with their

department's PPE decontamination policies in rural southeastern Michigan? This research can lead to a large improvement in the long-term health of firefighters by finding what can be changed in fire departments to allow better decontamination and agreement between firefighters and the policies.

Literature Review

The majority of my research has come directly from EBSCO to ensure that the sources were peer-reviewed and full-text. I used keywords such as decontamination, carcinogenic, and firefighting.

Carcinogens on PPEs

In a variety of different studies about carcinogens on PPEs (personal protective gear), research shows different substances such as polycyclic aromatic hydrocarbons(PAH) on the different items(Alexander 2012). Common PAHs found in firefighting include Formaldehyde, Benzene, and asbestos. PAHs are harmful and can cause life-threatening effects on the kidneys, livers, and eyes. Likewise, they are also known to have links with cancer. PAHs are most commonly found in the burning of wood, oil, coal, and most commonly tobacco. PAHs can enter the body and become harmful to firefighters in three different ways: inhalation, ingestion, and absorption.

In a study conducted by the International Agency for Research on Cancer (IARC), they looked into all the different factors in which firefighters could contract different carcinogens. The IARC also looked into the health aspects such as weight, age, and height of the recipients from whom they received data from. The study looked at exhaust from fire engines in the department as one of many of their perspectives concluding that the age of the engine, the quality of the diesel, and whether the engine

is running cold or warm, all play a role in the severity of which it can become harmful. (IARC 2023). The study shows how firefighters come in contact with many different types of carcinogens that can lead to potential cancer. These harmful toxins come from exhaust, smoke, and other chemicals. This study helps open up the gap which leads to the research now being conducted.

Likewise, the Everett Fire Department conducted an internal study on their department to determine if they had sufficient decontamination procedures that went with the goals of their organization. The EFD distributed an internal survey to their firefighters that had multiple open-ended questions. The results showed that the firefighters all had reasonably similar answers to this question; What are the reasons for on-scene post-fire activity decontamination policy? Out of the respondents, <85% answered the question with to reduce exposure to cancer-causing agents.

PPE Decontamination Methods

While there are different ways in which firefighters can take precautions when decontaminating their gear after fires, the majority of fire departments use similar if not the same methods. Every fire department has different policies for PPE decontamination especially from the amount of current research into the issue. With a scientifically proven increase in cancer in firefighters, their decontamination policies at the departments are a huge concern and can have a major impact on overall firefighter health.

The New Jersey government released its firefighter decontamination guidelines, which show what their departments do in order to maintain health. NJ fire departments as well as the majority of departments make sure to begin cleaning their PPEs as soon

as possible after a fire to ensure that the lowest amount of possible carcinogens can be absorbed through the skin. The NJ government makes sure to highlight that before the decontamination of any of their gear their personnel must be wearing some type of nitrile exam gloves. They also highlight that directly after the fire, on-scene firefighters must use hand wipes to wipe around the face, neck, hands, underarms, jaw, and throat. Their policies also include the order that their gear should be removed in order for the safest possible cleansing to occur (NJ Gov 2023).

Additionally, researchers at the University of Cincinnati conducted an experiment that looked into the efficiency of water-only decontamination on firefighters' turnout gear. The researchers first developed a central location where different firefighters came after their shift duties, where they could collect the samples before and after the water decontamination. The results showed that the water-only decontamination was not effective at all and actually led to a 42% increase in PAH contamination (Calvillo et al., 2019).

Psychometric Properties

When talking about research, especially within firefighting, the issue of psychometric properties is a huge factor that determines the validity and reliability of certain research. Psychometric properties determine study quality as well as whether the research is reliable enough to use in a scientific manner.

A study into psychometric properties, written by researchers at the University of Miami, took firefighters and looked into cancer incidence relating to them. The researchers looked into different possible errors that could occur when trying to make a conclusion on the data. However, the main purpose of the study was to look into

different literature relating to firefighter cancer and try to verify the reliability and validity of the text, focusing on psychometric properties. The results from the study of the different firefighter cancer research papers showed that based on validity and reliability the papers were all different (Ahn et al., 2023). Psychometric properties are the deciding factor between reliable research that can be trusted between different researchers; or unreliable research that has bias and can not be trusted between other researchers.

Justification

All of the studies that have been conducted showed an increase in firefighter cancer when not properly decontaminated post-fire. To go with that, the PPEs that have been properly decontaminated post-fire regarding the department's policies show a significant decrease to almost 0% carcinogens left on gear.

To help fill a gap in prior research the purpose of this study is to find out what departments have the most firefighters who agree with their policies of decontamination to find a comparison between them which can be used to help add on to other departments' policies who may have a lower amount of firefighters agreeing with the policies. The correct decontamination of PPEs and other equipment is a very important part of being a firefighter, leading to a significant increase in a healthier life longer while being a firefighter. If the firefighters do not agree with their department's decontamination policies that may lead to an increase in more firefighters developing life-threatening cancers.

Methodology

This study looks into the different methods used to decontaminate fire PEDs throughout Michigan fire departments. The main goal was to determine how different

firefighters feel about their department's decontamination methods and then link that to how well they work. This is relevant to the fire service because firefighters have an increased risk of developing cancer, so determining the best possible methods to clean PEDs can help lower the potential risk of developing cancer through firefighting. I chose to use a survey because that would be the best way to collect relevant information quickly as well as it would be very easy to sort through the data collected. The survey is a mix between multiple-choice and text-answered questions in order to collect both quantitative and qualitative data. The survey was targeted to all fire departments throughout Michigan to attempt to gather the most responses as possible to ensure accurate data was collected.

The first two questions on the survey begin with contact information and consent. The contact information is formatted through a short answer and I asked for email and or phone number. However, it is also stated that the contact information is not required, in order to have a group of people that would be able to be contacted at a later time to gather further information if needed. Then the consent question just states what the gathered information will be used for as well and no personal information will be leaked, it will all be left anonymous and confidential. All participants who provided data from the survey had the option to provide contact information but when asked for it was stated that it is optional and not required in order to ensure that everyone feels comfortable with the survey.

The following three questions are used to gather more information regarding the different subjects' occupations. Different questions were used such as, How long have you been in the fire service? What fire department are you currently working for? And,

How many fire calls does your department get per year? These questions are a mix between short answers and multiple choice depending on what the question is asking. Once this information is gathered it will help to sort the different participants based on their departments and how often they get different fire calls.

The next several questions after are specifically regarding different cancer decontamination methods and how firefighters feel about them. Questions such as, How common would you say cancer is in the firefighting service? This question is on a scale 1-10. The other few questions are focused on how the firefighters personally clean their gear such as what they do based on their department's policies and how they decontaminate on their own. These questions are also a mix between multiple choice, short text answer and long text answer. These questions specifically are stated in the survey in order to gather direct data in support of the claim.

The last question asks if the participant can be contacted at a later time for a possible interview. This question goes back to the contact information gathered at the start of the survey. As stated before this is an optional question in order to keep everyone's personal information safe, if the participant did not want to share their information they were not forced at all. This is asked in case an insufficient amount of information is found.

After the survey was completely finished I began distributing it to different fire departments and some retirees of the fire service via help from my research consultant, Kevin Schelmyer, and Lapeer fire captain, Brent Connell. The fire departments range from different sized departments around the state of Michigan which creates a better diverse sample. The survey was distributed to over 150 different firefighters. The

subjects are firefighters of all ages and ranks through their department, some still being new to the fire service and some veterans of the fire service.

The survey did unveil a few implications and limitations, however. The first major implication was the fact that the participants were completing the survey themselves, which is a good thing data-wise but this brought up the issue of short responses. In some of the questions that asked for in-depth responses participants may write short answers that may not even be able to be used for results. Another limitation was distributing the survey. The needed responses would need to be at least 50 participants from a range of departments across Michigan, including the upper and lower peninsula. This is an issue because the majority of fires are in the lower peninsula of Michigan just from the fact that it is less rural and has a greater state population. The last limitation comes from the sense that some people may just choose to not complete the survey. Since the topic could be considered a sensitive subject to certain people it required informed consent therefore the participants know exactly what their answers will be used for.

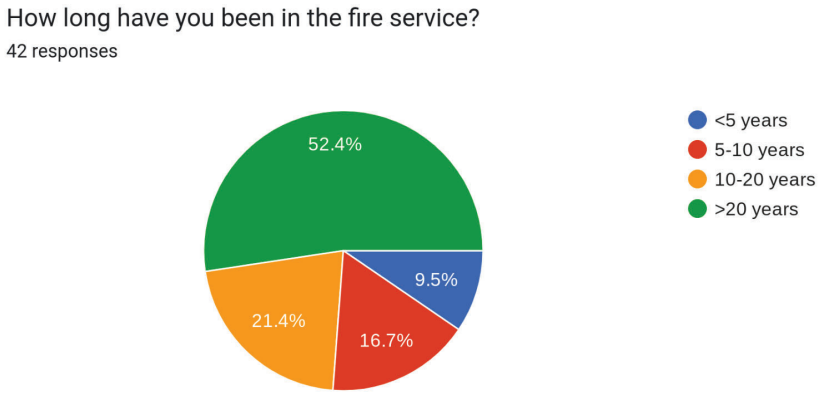
Results

Quantitative

The survey was distributed to over 20 different fire departments, however only 43 participants completed the survey. While this is not the exact number of participants that was wanted, the sample still works because of the vast diversity and distance of the different departments. The fire departments range throughout the lower peninsula of Michigan however the majority of them are located around the Flint, MI area.

Graph 1 shows how long the participants have been in and around the fire service to determine how they see the decontamination since elderly firefighters who may be about to retire or already are have been around many different methods of decontamination. The purpose of this part of the survey was to gather more information in order to group the participants based on their area of occupation. As seen in Graph 1, 52.4% of all participants who completed the survey have been in the fire service for over 20 years showing that they have lots of experience and knowledge of firefighting. Then followed up by the next big percentage of participants being firefighters who have been on the job for 10-20 years, 21.4%. This data alone shows that over 70% of all participants have been firefighting for 10 years or more.

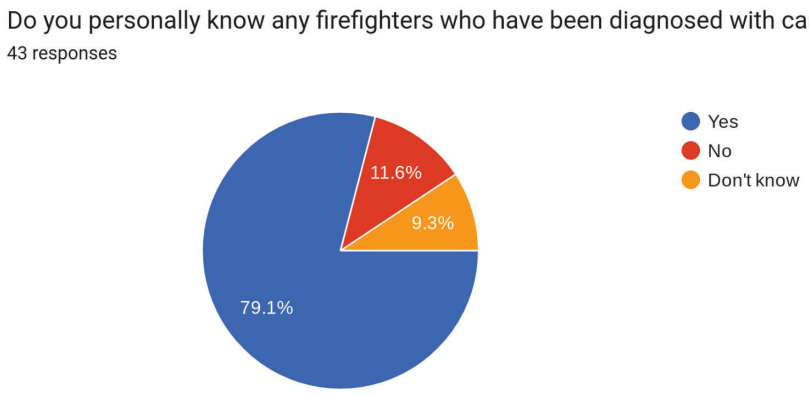
Graph 1: *Firefighter career length*



Graph 2 is used to determine how common cancer is through firefighting in the state of Michigan alone. The majority of the firefighter participants at 79.1% answered “Yes” when asked if they personally know any cancer diagnosed firefighters. Added on to this, almost 10% of the survey participants answered “Don't Know” rather than

answering “Yes” or “No” which means they may or may not know a firefighter with cancer so their response can be left out of the total data. This alone shows that cancer in the fire service is more common than just anywhere. While this data can not be used separately when looked at in comparison with the other collected responses it shows and adds the needed relevance.

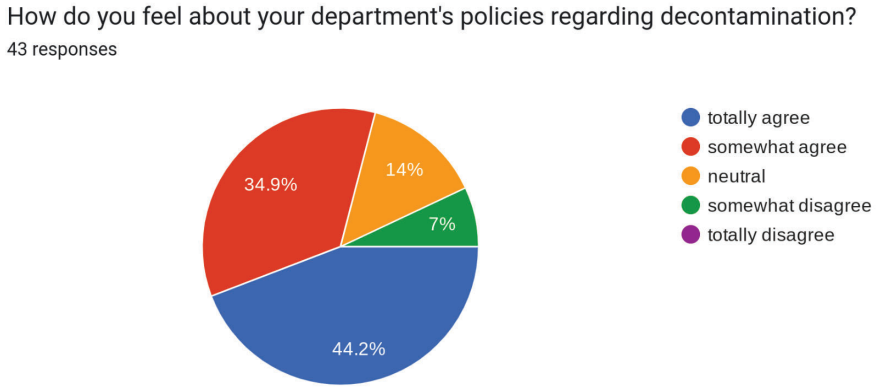
Graph 2: *Known cancer diagnosed firefighter stats*



In order to find a correlation between how firefighters feel about their department's decontamination policies and how well they really work, the question of, How do you feel about your department’s policies regarding decontamination, had to be asked. Graph 3 shows how much participants agreed with their department's policies and to what extent they agreed/disagreed. Less than 50% of all participants totally agreed with their department's policies(44.2% totally agreed). The next largest group was the participants who somewhat agreed at 34.9%. The rest of the participants either chose “Neutral” or “Somewhat disagree” None of the firefighters who took the survey

chose “Totally disagree”. A large majority of the responses who agree are from larger departments who get >200 calls per year, the majority of the neutral and disagree responses are smaller department firefighters who get <150 calls per year.

Graph 3: *Agreement/disagreement with decontamination policies*



Qualitative

The qualitative data collected from the survey came from different open-ended questions that required a typed-out response through a Google form. The reason for using open-ended questions was to determine what different methods of decontamination fire departments use and then use the collected qualitative and quantitative data to show how departments are different relative to their size.

As seen in Appendix A, the different departments are able to be grouped together based on the number of calls per year because the number of calls has a direct correlation to the departments' decontamination methods. The majority of the departments with >50 fire calls per year only do one of two things depending on what is

available at their department; either rinse down their turnout gear with power washers/hoses or use a designated washing machine designed for firefighter turnout gear.

Likewise, continuing to look at Appendix A, when the firefighters were asked about how they personally feel about their own department's decontamination policies the collected responses correlate to the size of the department. This found correlation can be used to group the data later. Found in Appendix A, over 90% of firefighters that are active in a department that responds to >301 fire calls per year agree to an extent with the decontamination policies of their department. One firefighter that somewhat disagreed with their department stated the following, “I would like to see the policies enforced better…” While keeping this in mind and looking into departments that receive fewer calls per year, more firefighters disagree with their policies to a certain extent. The firefighters who disagreed with their department's policies when asked what they might change said, either have an extra set of gear available when one is being cleaned or have a washing machine for their gear. The changes may not be available to be made due to a plethora of different factors such as available budget.

Discussion

The survey was designed to determine the extent to which firefighters agree and/or disagree with their fire department’s decontamination policy inorder to determine a correlation between firefighter cancer.

Findings

After looking into the collected data from the survey, it can be concluded that firefighter decontamination policies can be determined by the size of the department

leading to a further second conclusion that bigger departments with more fire calls per year have a better percentage of firefighters who agree with their carcinogen decontamination policies rather than smaller departments. This is proven through all the collected data in the distributed survey. Appendix A shows that of the departments that get 101-200 fire calls per year, out of all the survey participants 100% agree with their department's policies. Next with any department larger than that very few participants disagreed, with some stating neutral. The information gathered from the distributed survey leads to the stated conclusions made earlier.

Filling gap in research

The survey was conducted to fill one main gap found from previous research: do firefighters agree with their department’s methods of carcinogen decontamination after fire calls? Previous research mainly looked into different methods of decontamination and how well they worked rather than looking into the firefighters’ perspectives. The firefighters’ perspectives are a huge thing since they are the ones actually cleaning their gear and the methods of decontamination affect them personally. If a firefighter does not agree with their department’s policies it may cause them not to do the correct things in order to properly cleanse their gear. If the firefighter totally agrees with their department's policies then they will choose to do them rather than being forced into it. The purpose of the study was to determine how firefighters feel about their department's carcinogen decontamination policies and what they feel could be changed.

Implications

The gathered results from this survey can lead departments into focusing more on their firefighters' perspectives rather than just previous data. While the data collected

from actual decontamination testing is a major factor in play, if a policy requires an excessive amount of work to do firefighters are going to try to cut corners and look around it. If firefighters agree with what they are doing then they won't skip over important cleaning protocols. The results that were collected from the survey can also have more department applications. The results showed that the majority of the larger fire departments had more firefighters in agreement with their department's policies over the smaller departments that get fewer calls per year and have less employed staff. Therefore the research can be used to help show what the smaller departments can do to change their policies to gain more firefighters who side with the decontamination policies.

Limitations

Out of hundreds of firefighters who received the survey, only 44 responses were collected, which led to the limitation of participation. The survey could not be forced upon firefighters to complete; they would have to do it on their own time which led to this limitation. Another limitation was found in the collected data, for the free response portion of questions on the distributed survey participants were told to write down their answers to the questions in as much depth and detail as possible. While some collected data answers were in descriptive detail roughly 40% of the responses were less than 2 sentences which led to a lot of similar repetitive responses. The survey was limited to southeastern Michigan fire departments because those were the easiest to distribute the survey to since there are a large number of departments in the bigger Michigan cities in the southeast such as Flint and Detroit.

Area for future research

The findings from this particular area of research lead to the potential fulfillment of new areas of research. One potential area for new research could be developed through an experiment to try to find exactly to the best ability what decontamination methods clean the gear the absolute best. The main purpose of this study was to assess the firefighters' opinions on their departments' carcinogen decontamination policies rather than the scientific side of the decon methods. Another potential area for future research would be the comparison between the decontamination methods through their proven cleansing extent. Lastly, the researched question through this paper could be expanded throughout the country or even the world, rather than just the state of Michigan alone.

Conclusion

Through a survey that was distributed to firefighters across rural southeastern Michigan, this study shows the extent to which firefighters agree and/or disagree with the decontamination policies put in place by their departments. The findings of the study can be used to help find better solutions for firefighter decontamination post-fire that the firefighters actually agree 100% with. Likewise, the information gathered from the survey also fills a crucial gap in previous research, by showing what firefighters agree with doing to decontaminate their PPEs. The research shows that the policies put in place by larger fire departments have more firefighters in agreement with their methods of decontamination leading to the possibility of smaller departments potentially including more of the methods used by the larger departments.

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Appendix A: *Open-ended responses from survey respondents.*

How many fire calls does your department get per year?	What do you personally do to clean your gear after a fire? (as detailed as possible)	On a scale of 1 to 10, How common would you say cancer is in the firefighting service?	Do you personally know any firefighters who have been diagnosed with cancer?	How do you feel about your department's policies regarding decontamination?	Are there any things you would personally change to your department's decontamination policies?
51-100	Put turnouts and nomex hood into the gear washer followed bu the turnout dryer and wash my mask and helmet with soap and water	8	Don't know	totally agree	No
51-100	I use a pressure washer, soap and a brush to clean off my gear after a fire. I'll wash it with water then scrub it and wash it off again.	6	Yes	neutral	Just possibly getting a washing machine gear to clean gear
51-100	Wash it	10	Yes	totally agree	No
51-100	brush off, spray off, wash in extractor at the	8	Yes	somewhat agree	

	fire hall.				
51-100	Wash down, Decon spray, brush, wash down, rack dry	8	Yes	somewhat agree	
51-100	Most of the time I try to get the majority of stuff off before leaving the scene. Then we have cleaners back at the hall and I clean the gear. We do not have a gear washer to clean it better.	7	Yes	somewhat disagree	Buy a washer. Enforce people not cleaning PPE.
51-100	Rinse it down and scrub it with a brush then when it gets worse washing machine	5	Yes	somewhat agree	They need to be looked at again they're starting to get a little bit old this just reminds me to do it I'll put that on the list thank you
201-300	Our new policy is to wash the gear after a working structure fire. And use our back up gear while the other set is being cleaned and is drying.	6	Yes	somewhat agree	Having the resources to have two sets of gear for on duty responses.

201-300	Depending on the severity of exposure, either spray it down or tear it apart and wash it and dry it.	9	Yes	somewhat agree	We could definitely do better at decontamination. Our next apparatus will be a clean cab and I think that is a step in the right direction. We don't do much now as far as on scene decontamination unless there are hazardous materials involved.
201-300	Wash in washing machine with approved gear wash and dry on gear drying rack	8	No	totally agree	
101-200	Decontaminate at the scene with garden hose/brush, then upon return to the station wash gear. All firefighters have 2 sets of geat	8	Yes	totally agree	No
101-200	Gross decon at the scene then wash gear at the station in a extractor	9	Yes	totally agree	No
101-200	Wash outer shell and inner liners separately in a gear extractor with mild detergent than hang dry in an industrial	7	Yes	totally agree	No

	gear dryer				
101-200	I use our gear washing machine after I use my gear at any type of fire I am involved in.	6	Don't know	totally agree	No
>301	Yes	10	Yes	totally agree	Have a second set of gear
>301	Spray or wipe down at scene. Upon arriving back at the station if needed I will than spray it down with a garden hose before putting into our turnout gear washer.	10	Yes	totally agree	Stricter enforcement of the policy for those who do not comply with it
>301	Wash gear in gear washer	10	Yes	somewhat agree	Yes we need two sets to allow for adequate cleaning to happen
>301	Wash in machine, air dry	10	No	totally agree	Possibly another washing machine
>301	All gear gets advanced cleaning in our gear extractor. Anything that is a soft material (webbing, work gloves, radio strap, etc) that can is in my pockets or on me gets cleaned. Everything else gets wiped off	8	Yes	somewhat disagree	I would like to see the policies enforced better and have more members take the initiative to clean their gear. It only benefits them.
>301	Gross Decon at the incident,	5	No	totally agree	

	with machine washing at the station.				
>301		9	Yes	neutral	
>301	Wash my gear in a gear washing extractor	8	Yes	somewhat agree	I feel we are doing better than we have in the past. Maybe a clean cab concept might help.
>301	PPE (turn out coat/pants/hood /gloves) is cleaned with department extractor and dried with room temperature forced air. SCBA mast is clean and decontaminated using approved products. Helmet is cleaned with soap and scrub brush. Boots are cleaned in the same fashion. Both helmet and boots are air dried.	8	Yes	somewhat agree	Yes, we need to find a way to ensure that we decon after each IDLH atmosphere we encounter.
>301	Rarely gets soiled due to on scene responsibilities. Cleaned no less than twice yearly regardless of being soiled or not.	6	Yes	somewhat agree	More consistency in being applied. Doesn't seem to be an obvious point of responsibility (apparatus operator, IC, ISO, etc.)

>301	Rise off all gross contaminants, then wash gear in extractor as outlined by manufacturer. Gloves, boots, and helmet cleaned per manufacturer recommendatio ns. I did this for the last 10 years or so of my career. Prior to that, I didn't clean my PPE anywhere near as well.	10	Yes	neutral	Don't know what the department's current policies are.
>301	Decon wipes for your face. Put contaminated gear in a large trash bag. Once back at the station you place your gear in a gear washer with citrus clean. Wash your helmet by hand with citrus clean. Gloves will be place in a bucket to soak in citrus clean	9	Yes	totally agree	More people need to follow the proper procedures.
>301	With a power washer, or put it into an extractor	8	Don't know	somewhat disagree	Every department should have an extractor, nobody should take gear home and wash it. The trucks should be deconned after

					every call
>301	Utilize a special washing machine	7	No	somewhat agree	
>301	depends on the fire & job assignment	10	Yes	neutral	more gloves available at fire scenes
>301	Wash all my gear in our extractor. Clean boots and helmet with soap and water.	10	Yes	totally agree	I wish we did a better job adhering to our dept. decontamination policies.
>301	I clean my gear after every structure fire	10	No	totally agree	None
>301	Spray off with hose and run through gear washer	7	Yes	somewhat agree	We need to be more proactive about getting people who went interior to take a shower when we get back to the station
>301	Take everything out of the Pockets, clip all of the clips, put together all of the Velcro and throw everything that I was wearing in that fire into the washer when I get back to the hall.	9	Yes	totally agree	Make sure everyone is completing this before you enter the vehicle either in your POV (personal vehicle) or the fire apparatus.
>301	Decon at the scene and then wash gear as soon as we get back to the Fire Station.	9	Yes	totally agree	We need to decon more often

>301	After a structure fire or any other call that may require it to be washed my gear gets washed in our industrial washing machine. Otherwise it gets brushed off or hosed down if necessary.	8	Yes	somewhat agree	Better enforcement of the policies.
<50	After a fire we just use a powerwasher to wash all turnouts. My hood, that protects your head, I will take that home and wash that in a washing machine.	6	Yes	neutral	Unfortunately, currently we are doing just about the best we can with what resources we have. We are in the process of getting a gear washing machine for the station. I personally feel like that will be a big step in helping getting contamination off of our gear.

<50	Our current Firefighting turn-out gear cleaning prosses includes: gross decontamination with a fire hose after an incident; followed by separating the turnout gear into inners and outers; then running each set through a standard washing machine twice. We only have one standard washing machine so only one set of gear can be washed at a time. The gear is then hung to dry.	7	Don't know	neutral	I would recommend no allowing structural gear in cabs after an active fire, and also getting an extractor.
<50	Powerwash with an electric powerwasher	8	Yes	totally agree	Switch out and decontaminate helmet band material after fires
<50		8	Yes	totally agree	No
<50	wash it with our extractor with the correct cleaner	7	Yes	somewhat agree	be stricter
<50		7	Yes	totally agree	

<50	When I was an active duty firefighter with the City of Novi Fire Department (retired 2017) I would wash my turnout gear, gloves and hood in the designated washing machine using the detergent specified by the department.	8	Yes	somewhat agree	I think our policy as it was written was fine. One thing I would change is that I would place an officer in charge of ensuring ALL gear was sufficiently washed after a structure fire; not leave it up to the individual to say they got it done. Most firefighters were very good about washing their turnout gear and gloves. But in my opinion, looking back I'd say many (and myself included) were not as good about washing/decontaminating their helmet. I feel like that was overlooked.
	Use department washing machine.	8	Yes	somewhat agree	Make it mandatory to wash turnout gear after every fire.

Research Question:
To what extent do firefighters agree with decontamination methods to decrease potential cancer, throughout firefighters in Michigan?

Academic Paper

Note: Student samples are quoted verbatim and may contain spelling and grammatical errors.

Sample: E
Score: 3

This paper earned a score of 3. This paper addresses the topic of fire departments' decontamination policies and procedures for protecting firefighters. The research objective was "… to fill a large gap in the previous research gathered, how can fire departments change their decontamination policies to better suit their firefighters[?]" (p. 2). Overall, the paper focus is narrowing but carries this same focus through the method and reasoning.

This paper did not earn a score of 2 because there is a description of a reasonably replicable research method on pp. 6–9, a survey of 43 or 44 firefighters in Michigan, employing Likert scale and free-response questions. The results on pp. 9–13 reveal a new understanding that emerged from student-generated data, summarized as: "firefighter decontamination policies can be determined by the size of the department leading to a further second conclusion that bigger departments with more fire calls per year have a better percentage of firefighters who agree with their carcinogen decontamination policies rather than smaller departments" (pp. 13–14).

This paper did not earn a score of 4 for a few reasons. First, the paper lacks a clear and narrow focus. This is evidenced by the research objective mentioned above narrowing to the research question on pp. 2–3: "To what extent do firefighters agree and or disagree with their department's PPE decontamination policies in rural southeastern Michigan?" However, the research objective was again revised on p. 6 and then revised again on p. 29. Second, while the topic is situated by the literature review on pp. 3–6, there is only the brief identification of a research gap on p. 6, which does not constitute a logical explanation of how this research addresses that gap. Third, the paper only briefly defends the use of a survey as "the best way to collect relevant information quickly as well as it would be very easy to sort through the data collected" (p. 7), and the decision to rely solely on this method was never defended.

Taken together, this paper achieves reasonable replicability of the method and displays a new understanding that emerged from student-generated data, but a lack of contextualization in previous scholarly literature and lack of defense of methodological decisions meant this paper only presented an ineffectual argument for a new understanding.