

INNOCENTIVE CHALLENGE: PROBLEMS TO BE SOLVED TO IMPROVE GLOBAL HEALTH & WELLNESS (ID # 5752547895)

PROBLEM STATEMENT

Uniforms are worn by emergency services workers, worldwide, for a large portion of their day and in strenuous, hazardous conditions. These people work, sleep, commute and spend time at home in uniform.

There are some **international guidelines and standards** for certain types of uniforms. However, these only target specific health and safety problems. It is complex, confusing and repetitive for designers and procurement teams to address the numerous, and serious, health risks from the wrong uniforms.

This problem relates to standard uniforms such as fire station uniforms and US police class B duty uniformsⁱ – i.e. worn for long periods day-to-day in normal conditions, and also often under protective equipment. It does not relate to hazardous/protective/tactical gear (e.g. firefighting equipment or police body armour).

CONSUMER INSIGHTS

Current research and standards have a very narrow focus. There are no comprehensive, wide-ranging industry standards/guidelines for manufacture, procurement and/or use of uniforms in a health and wellness context.

Sharing knowledge would save lives (& money), however the industry is siloed. There is little alignment within or between emergency services even within countries, and global standards only relate to a narrow range of health and safety issues. Needs assessment and rationale are further siloed due to commercial sensitivity.

Ecommerce and networked solutions increase the ability to design and purchase small batches of uniforms from multiple suppliers, and there is often pressure from public sector agencies to purchase from local (i.e. often more expensive and less experienced) suppliersⁱⁱ. However, this further fragments ability to meet health and safety standards. R&D is expensiveⁱⁱⁱ. New, smaller players in market are difficult to regulate and have few incentives to meet requirements if not specifically contracted (e.g. to meet narrow ISO requirements).

Health	
Chemicals to make & treat uniforms	
Allergic reactions common ^{iv v vi} . Uniforms not fitting female workers, increasing risk to hazards, chemicals and reproductive problems ^{vii viii}	
Fire protection	ISO 21942:2019 ^{ix} , NFPA 1977 ^x
Lack of research into underclothing, and stationwear not keeping up with smart fabric technology ^{xi}	
Wearing gear in public, at home and/or washing own clothes	
Workers and household at risk (infection, chemicals, contaminants e.g. asbestos) ^{xii xiii xiv} .	
Protection from pathogens	NFPA 1999 ^{xv}
Not usually a basis for police/fire/non-EMS uniform procurement, workers at risk during medical callouts. Lack of clarity over standards, purchase & use of new Personal Protective Equipment that may be defined/designed as part of uniform (e.g. masks). Issues with efficacy of antimicrobial products on hospital scrubs ^{xvi} .	
Visibility in dangerous conditions	NFPA 1977 ^{xvii} , ANSI/ISEA 107-2020 ^{xviii}
Lack of consistent standards on reflective materials/design, and reluctance of workers to wear additional apparel (high vis vests, etc.) ^{xix} . Risk of traffic accidents when working near roads ^{xx} .	
Integration of tactical gear in uniform design	
No common standards or guidelines for making/modifying uniforms to easily integrate tactical gear (e.g. body armour flaps, radio clips, body camera loops, earpiece buttonholes, hidden pockets). Injury/obstruction risk ^{xxi} .	
Fitness	
Integration of fitness & location trackers in clothing	
Difficulties in comfortably/safely retrofitting trackers into clothing, or not considered during purchase.	
Fit and wear of uniforms	
Uniforms ripping/failing and/or restricting freedom of movement ^{xxii xxiii xxiv} . Trip/fall/snag, blood flow issues. Uniforms not fitting female workers, increasing risk of thrush and similar issues ^{xxv}	

Appearance	
Identification as an emergency services worker	
EMS/fire/other uniforms mistaken for law enforcement. Increased risk of being attacked ^{xxvi xxvii xxviii} .	
Identification as a law enforcement officer	
High level guidelines (e.g. US Police Class A/B/C uniforms), but not standardised between or within services. No international best practice ^{xxix} . Police use of ex-military uniforms (and some new designs) leading to concerns about police 'militarisation'. Mental stress among public, and risk of officers of being attacked ^{xxx xxxi} . Design of uniforms making it easy to mask or remove insignia or identifying marks (name/badge no. etc) ^{xxxii} . Risk to public of misuse of police power when not identifiable.	
Sun and weather protection	
Uniforms not designed for outdoor/strenuous use in heat and sun (and many places have policies stopping them from removing gear or using alternatives) ^{xxxiii xxxiv xxxv} .	
Cultural and religious dress	
Outdated policies restricting the use of religious garb, e.g. turbans and hijab (i.e. apparel-related problem is lack of guidance about how to integrate these garments but still meet the health and safety requirements for uniforms not to be restrictive or hazardous in the line of work) ^{xxxvi} .	
Sleep	
Workers sleeping in clothes (high-pressure/shift work)	
Transmission of bed bugs and infestation from sleeping quarters ^{xxxvii} . Options such as permethrin treatment are common for military uniforms but not in other emergency services ^{xxxviii} .	

ESTIMATED SIZE OF THE PROBLEM

	Global population (not all in uniform)	Global market (US\$)
Medical clothing	Approx. 59m health workers (2016) ^{xxxix}	US\$99.9b by 2027 ^{xl}
Law enforcement & military	e.g. approx. 1.5m police in China and India, approx. 1m in US (2017) ^{xli} .	US\$2.8b in 2018 ^{xlii} / estimates USD\$1.3b in 2020 ^{xliii}
Protective clothing materials	(mainly firefighting, with growth opportunities in construction & manufacturing protective clothing)	US\$8.7b in 2019 ^{xliv}

The topic may also be relevant for the "Workwear" market (US\$32.6b in 2020, estimated US\$42.7b by 2026^{xlv}), and others such as school uniform market (US\$16b in 2019, estimated US\$27b by 2026^{xlvi}), prisoners, and service/aviation/hospitality/security/government (e.g. postal, civil defence) industries.

Other problems outside the Challenge scope relate to; Ethical sourcing of materials^{xlvii}, Sustainability in manufacturing practices (safe workplaces, environment, communities)^{xlviii xlix}, Ethical labour^l.

ESTIMATED SEVERITY OF THE PROBLEM

As above, most of the problems relate to medium or long-term health issues, and can range from discomfort (e.g. rash, skin infections) to serious health dangers (chemicals, contaminants, infection). Other problems have real health impacts but are difficult to quantify – e.g. restrictive or inappropriate uniforms interfering with hazardous work, risk of vehicle accident because of lack of visibility, risk of attack by members of the public.

Other consequences are – regularly – union issues, public reputation, high court cases, public fines and costly processes to change or replace uniforms (refer context to references in endnotes).

As above, some detailed solutions exist for a narrow band of problems (e.g. fire retardant clothing). However, there are large silos and no systematic, coordinated and inter-sectoral/international guidelines. For some problems above, there are no current solutions or definitions of best practice.

HIGH-LEVEL ESTIMATED SOLUTION – EXAMPLES

- Global industry Charter, or voluntary standard, or similar about the intersection of different health and safety needs for uniformed personnel (may be backed up by white papers, position statements etc from global commercial/academic leaders and emergency service representatives). **Publicity/Reputation.**
- Online Center of Excellence for industry best practice – aimed at supporting procurement teams to research, design and decide on uniform specs, and to host forums/events/education. Could include an international quality mark/rating system. **Publicity/Reputation/Commercial opportunity.**
- New apparel/materials/textiles advertised as solving *multiple* problems above. **Commercial opportunity.**

APPENDICES

APPENDIX 1: SOLVER INFORMATION

- New Zealand Citizen and resident.
- If successful, I am interested in opportunities to partner with the Seeker at the conclusion of the Challenge.
 - o I have professional expertise (~10 years) and postgraduate qualifications in public sector emergency management (I do not have experience in apparel, materials, or the textile industry).
 - o My other experience is in Communications, recruitment, and public sector policy & strategy.

APPENDIX 2: REFERENCES

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 - ^{xxi} <https://www.officer.com/on-the-street/apparel/article/21216731/current-trends-in-law-enforcement-uniforms>
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