Hello!

As you know, my property ends where Bridge Industrial's permitted 2.5 million square feet warehouse complex will begin. In 2020, I had just bought my retirement home for my multi-generational family including my adult disabled sons. We are near extended family in King County and dear friends in Tacoma, Olympia, and beyond. This is a dream come true to be able to grow old surrounded by family and loved ones.

When we found out about the planned warehouse, I was puzzled that the One Tacoma Comprehensive Plan did not constrain Planning and Development Services Department Director Peter Huffman in making this decision -- the decision in which he was able to determine this construction would have a nonsignificant effect. A project of any size never automatically triggers an EIS? Wow! Director Huffman can legally make this decision! Wow! This is because the City Council has not made ordinances to guide development in Tacoma. I list below some of the aspects of the One Tacoma Comprehensive Plan that should be guiding and constraining PDS. If the Plan itself does not on its own constrain PDS, I ask the City Council to make such ordinances to implement the Plan. Please see some things I've copied from The Plan that I would like to see affecting decisions in our city.

Thank you.

The Comprehensive Plan sets forth the following goals and policies related to air quality and climate resiliency and trees and etc..... (took this from the MDNS)

• GOAL DD–4 Enhance human and environmental health in neighborhood design and development. Seek to protect safety and livability, support local access to healthy food, limit negative impacts on water and air quality, reduce carbon emissions, encourage active and sustainable design, and integrate nature and the built environment.

• GOAL DD–5 Ensure long-term resilience in the design of buildings, streets and open spaces, including the ability to adjust to changing demographics, climate, and economy, and withstand and recover from natural disasters.

• GOAL DD–7 Support sustainable and resource efficient development and redevelopment.

GOAL EN–1 Ensure that Tacoma's built and natural environments function in complementary ways and are resilient to climate change and natural hazards.

• Policy EN–1.11 Coordinate and partner with federal, state, regional and local governmental jurisdictions and the public to manage the City's environmental assets.

• Policy EN–1.14 Continue to partner with other public and non-profit organizations to inform citizens of the stewardship needs of Tacoma's environmental assets, and to develop, offer and support restoration training opportunities and practical information resources.

• Policy EN–1.17 Assess and periodically review the best available science for managing critical areas and natural resources and utilize the development of plans and regulations while also taking into consideration Tacoma's obligation to meet urban-level densities under the Growth Management Act.

• Policy EN–1.27 Assess the risks and potential impacts on both City government operations and on the community due to climate change, with regard to social equity.

• GOAL EN–3 Ensure that all Tacomans have access to clean air and water, can experience nature in their daily lives and benefit from development that is designed to lessen the impacts of natural hazards and environmental contamination and degradation, now and in the future.

• Policy EN–3.2 Evaluate the potential adverse impacts of proposed development on

Tacoma's environmental assets, their functions and the ecosystem services they provide.

• Policy EN–3.3 Require that developments avoid and minimize adverse impacts, to the maximum extent feasible, to existing natural resources, critical areas and shorelines through site design prior to providing mitigation to compensate for project impacts.

• GOAL EN–4 Achieve the greatest possible gain in environmental health City-wide over the next 25 years through proactive planning, investment and stewardship.

• Policy EN–4.7 Ensure that plans and investments are consistent with, and advance, efforts to improve air quality and reduce exposure to air toxics, criteria pollutants and urban heat island effects. Consider air quality related health impacts on all Tacomans.

• Policy EN–4.8 Achieve criteria air pollutant reductions in both municipal operations and the community.

• Policy EN–4.41 Support the reduction of Tacoma's greenhouse gas emissions consistent with the City's adopted targets.

• Policy EN–4.45 Encourage energy efficient buildings and installation of renewable energy sources and technologies.

Goal EN–4 Achieve the greatest possible gain in environmental health City-wide over the next 25 years through proactive planning, investment and stewardship.

• Policy EN–4.2 Encourage landscaping designed to complement local wildlife and native or climate adapted vegetation and help offset the loss of wildlife habitat areas resulting from past development practices.

• Policy EN–1.23 Assess and reassess Tacoma's tree canopy coverage on a regular basis so as to be able to track the potential implications on environmental health and inform future policies and practices with regard to preservation and targeted tree planting efforts.

• Policy EN–1.24 Develop environmental protection plans, programs and regulations that focus on high value natural resources and the types of protections to be applied, based on best available science, and on an evaluation of allowing conflicting uses.

• Policy EN–4.29 Ensure that plans and investments are consistent with and advance efforts to improve the quantity, quality and equitable distribution of Tacoma's urban forest:

a. Strive to achieve a citywide tree canopy cover of 30 percent by the year 2030 ("30-by-30")

b. Require or encourage the preservation of large healthy trees, native trees and vegetation, tree groves and forested areas as an element of discretionary land use reviews

Coordinate plans and investments with efforts to improve tree species diversity and age diversity

d. Invest in tree planting and maintenance, especially in low canopy areas, neighborhoods with underserved or under-represented communities and within and near Open Space Corridors

e. Promote the restoration of native trees and vegetation in Open Space Corridors, buffers and shorelines

f. Encourage planting of native or climate adapted trees and vegetation generally, especially in Open Space Corridors

g. Identify priority areas for tree preservation and planting in the development of subarea, neighborhood and watershed plans

• Policy EN–4.38 Encourage the selection of project, location and site condition appropriate species as well as a diverse set of plant species, especially those that support wildlife habitat.

Dr. Michelle S. Mood (she, her, hers)
(c) 740-233-6333
3719 S. Gunnison St
Tacoma, WA 98409

Dear Planning Commission,

It is important that you realize that all this building of apartments is NOT CREATING AFFORDABLE HOUSING.  It is also taxing our extremely old infrastructure.  Our treatment plant is unable to handle all the sewage they treat and it is spewing contamination into our bay (according to information from a source), also, our city's actual infrastructure is so old, it is not able to handle all this construction.

You, however, are letting this happen without thoroughly researching all this before approving all this work.  It is important to note that we also have short supply of water. Our water dept says that we are okay.  I made comments to an IPS meeting sometime ago that the governor had come out, last year, and reported that Snohomish, King, and Pierce were okay waterwise. Okay?  I indicated to Kristina that because the rest of the  state was in drought and the lower southeast corner of the state was in severe drought long before his announcement – that if the governor deemed it necessary, water would be sent to those cities to help people stay alive.  This happened to Arizona.  The TPU person at the IPS meeting table said, "The waters can't flow over the mountains."  How stupid can you get.  Is this what we have working for us and making critical decisions?  Water will be trucked!!!

I hope you have heard that the City of Bellevue and Kirkland have asked their residents to be careful and not use too much water. If you did not hear it, it was in the news.  Check it out. SPU Ask 1.5 Million People to Use Less Water to Stretch Region's Water Supply (seattle.gov)

You need to know that we have lost 4 glaciers on Mt. Rainier that provide snow runoff water to our Green River.  WATCH THE SCIENCE.  This loss of glaciers is growing and we need to be careful not to build more than we can handle.

Also, we have  reports of townhomes built in an old part of our community and when those townhomes use their water for washing, bathing or dishwashing at night, it is causing some homes to get the basements flooded and faucets coming on at night. That is pressure that the old infrastructure is undergoing because of the larger pipes feeding into the smaller community infrastructure pipes.

Sadly, WE THE HOMEOWNERS will be saddled with the bill to fix all this while these builders

are building apartments that are getting tax exemptions. You have three previous colleagues on the Commission that wrote the HIT Minority Report – telling you and the city that this HIT program WOULD NOT create affordable housing.  Yet, you still went with it and are destroying Tacoma.

I hope you also listen to the fact that we do not need Midscale along transit corridors.  We need to have our City Council working to bring businesses to Tacoma instead of losing them. We must not be made a bedroom community to Seattle.

We NEED HOMES, TOWNHOMES WITH DEFENSIBLE SPACE FOR HOMEOWNERSHIP SO THAT YOUNG PEOPLE AND OLDER PEOPLE WANTING TO DOWNSIZE BUT CONTINUE BUILDING WEALTH.  THIS IS NOT BEING DONE WITH THIS PROCESS.

We need to make sure that contractors are putting in concrete walls between townhomes. This will help prevent a fire from extending to the adjacent homes.  If our insurance agencies are up to speed with what is being done in other states, THEY CAN OFFER Homeowner's insurance instead of the costly Townhome Insurance.

Having served on the Planning Commission until 2000, I will tell you this – our Planning Dept representative encouraged us to make whatever changes were needed to make for the good of the people (not special interests).  I was told this, "Esther, this is precisely what you as a Commissioner is supposed to do.  You don't take what we present and do nothing. You make your changes that can be offered."

So, just because you are told that we have enough water and our infrastructure is okay, DON'T BELIEVE IT.  Check it out for yourselves.  That is what you should be doing.

Save Tacoma, we don't need Midscale RENTAL along transit corridors to create customers for transit.  WE need space for businesses and for homeownership opportunities – NOT RENTAL NOOSES ON OUR CITIZENS.

Sincerely,
Esther Day

May 26, 2021

The Honorable Mayor and City Council
City of Tacoma
747 Market Street, Suite 1200
Tacoma, WA 98402

**RE: Home In Tacoma Project – Minority Report**

Honorable Mayor Woodards and Members of the City Council,

We, Commissioners McInnis, Edmonds and Givens, want to offer this Minority Report to provide an explanation for not fully supporting the *Home in Tacoma* Project. As is often the case in a complex issue like this, those that vote against it do so for differing reasons. In order to properly explain the reasons for the three 'nay' votes, I have categorized the reasons below and identified the dissenting commissioners that are in agreement. Suffice it to say, however, that the haste with which Home In Tacoma has been compiled and moved forward is a concern shared by all of us and the underlying reason for all of our itemized concerns below. This matter is much too important for us to get wrong.

Commissioners McInnis and Edmonds believe that the Home in Tacoma (HIT) plan will not respond to the affordable home crisis that we are experiencing in Tacoma. While HIT creates an environment in which additional housing can be created, the units that will be created are going to do very little for affordable housing. Both Vice Chair McInnis and Commissioner Edmonds have considerable experience in the real estate and development market. We understand the process that developers go through to evaluate a project. Projects that could be built for affordability typically require reduced development costs and are often built in areas with reduced real estate costs.

Those are not the types of developments that will be created by HIT because HIT does nothing to encourage developers to seek lower cost real estate nor does it provide any relief from "soft" development costs (permits, etc.). There are still significant development costs to overcome in these "market-rate" projects, and HIT does nothing to respond to that. The projects that will be created as a result of HIT will be those with sufficient revenue to allow payback in the timeline required by lenders.

For that reason, we will not see affordable development occur as a result of HIT. We will see more development in Tacoma, but it will be of the type that we have seen recently in the Proctor District – higher end developments with expensive rents. Little will be done to improve affordability. In the process, some historical buildings will necessarily be removed, the character of our neighborhoods forever changed, and we will still be faced with an affordability crisis.

We have an opportunity and responsibility to find real ways to provide affordable housing in Tacoma. Doing so well requires a much more detailed approach than a blanket policy affecting the entire City. It requires:

1. Finding ways to reduce development costs with reductions in permitting fees and timelines
2. Reviewing each neighborhood for opportunities to provide incentives for developers to pursue redevelopment of specific parcels
3. A policy with real thresholds and requirements about how affordable development can actually be realized, such as height bonuses, tax abatements, and permit cost and timeline relief

While we understand the desire to put something forward quickly, the Home In Tacoma policy misses the mark. We need to take additional time to put together a real policy that truly addresses affordable housing in Tacoma instead of putting forward a hastily compiled policy that will do nothing to address our current problem while at the same time erode the quality and character of Tacoma.

In summary, Vice-Chair McInnis and Commissioner Edmonds have concerns that the policies (i) will not produce affordable housing, (ii) will encourage a different type of development that will change

neighborhood character (iii) will fail to address affordability, (iv) will reduce single-family housing supply, (v) and will cause building-scale conflicts in existing neighborhoods.
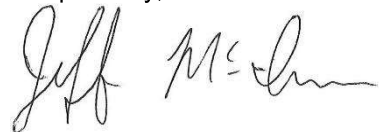
**Mapping Concerns** - All three commissioners are concerned with the map agreed upon by the Commission. These concerns include:

- **Low-Scale Residential Housing Opportunities appear Sufficient to Respond to Housing Needs:** The proposed policy changes would allow for additional housing types in addition to single-family houses in the Low-Scale classification (e.g., duplexes, triplex, & cottage housing) – this increases our housing capacity/options in existing neighborhoods with less reliance on expanding the Mid-Scale Residential designation.
- **The Mid-Scale Residential expansions are not focused near designated Corridors/Centers** – we believe that future Mid-Scale Residential should be introduced at strategic locations as part of neighborhood planning activities over the next five years. Neighborhood-level refinements would allow for additional community engagement, target housing on underutilized properties, and focus new mid-scale residential near parks, schools, colleges, commercial nodes, and similar existing housing types.
- **Apartments are Introduced in Isolated Locations:** The proposed map introduces Mid-Scale Residential at seemingly isolated locations across the city which are outside established nodes, transit corridors and neighborhood centers and/or near clusters of existing apartment/townhouse development (e.g., N. 15th, Norpoint Way NE, 49th Avenue NE, E. Roosevelt).
- **The Plan Creates Low-Scale Islands:** The proposed map amendments will create small islands of Low-Scale Residential that would be otherwise surrounded with Mid-Scale Residential (e.g., N. 24th & Warner Street, N. 11th & Alder, N. 9th & Union, S. 11th & Pine, S. 80th & Yakima).
- **The Plan Creates Disproportionate Expansions in Certain Neighborhoods:** Due to irregular block configurations, the proposed map amendments would disproportionately expand Mid-Scale Residential into existing neighborhoods (e.g., south of the 6th Ave. Center, NW edge of Hilltop, E. 56th & McDacer).
- **The Plan Fails to Recognize Existing Apartment Clusters**: The proposed Mid-Scale Residential designations are not applied to existing apartment/townhouse communities near Corridors/Centers, which perpetuates nonconforming situations and limits expansions (e.g., west/east sides of U. of Puget Sound, N 6th & K, N. Grant & Division, S. 9th & Sheridan).

We believe the project's expedited timeline prevented the Planning Commission from fully discussing all issues attending this important issue and from arriving at a project that will respond to the needs of the majority of the residents of Tacoma.

We hope this provides clarity on why we were unable to reach full consensus. Like our fellow commissioners, we acknowledge that Tacoma is facing an unprecedented housing crisis and our land use/regulatory framework should allow for more diverse housing options while recognizing existing neighborhood character.

Respectfully,

**Jeff McInnis, Vice-Chair**
Tacoma Planning Commission

**Carolyn Edmonds, Council District 2**
Tacoma Planning Commission

**Ryan Givens, Architecture, Historic Preservation, and/or Urban Design**
Tacoma Planning Commission

| **From:** | Chami Ro <chami.ro@kscseattle.org> |
| **Sent:** | Monday, October 2, 2023 3:30 PM |
| **To:** | City Clerk's Office |
| **Cc:** | Brian Frost; David Hwang |
| **Subject:** | Public Comment Request for City Council Meeting |
| **Attachments:** | image001.png; MICROSYSTEMS IR (EN) (2).pdf |

| **Follow Up Flag:** | Flag for follow up |
| **Flag Status:** | Flagged |

Hi Hollyann,

Thank you for allowing me to send information about my request for public comment at tomorrow's city council meeting.
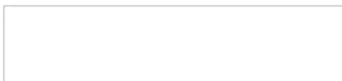
I represent KSC Seattle, a nonprofit organization that provides assistance/support to Korean startups in launching their business in the US, especially in the Northwest. We are working with many interesting technologies, especially one of them stands out for mutual interest:

Microsystems: it uses electric field to wipe off water on this hightech glass surface at contact. Currently this hightech glass is being used on security cameras that are ideal for rainy areas such as the Northwest. Whether on a sunny or rainy day, this camera will always provide clear image without any water drops. There is an opportunity for the City of Tacoma to get free security cameras if it can sign a Letter of Intent by 10/5/23. This is the reason that urges me to be able to speak tomorrow during public comment time.

I look forward to hearing from you with the approval that I will be allowed to briefly speak about this opportunity to the mayor and council members. Thank you for your help.

All my best,

**Chami Ro (she/her)**
**Marketing & Program Manager | K-Startup Center Seattle**
206-806-8369 Ext. 1001

Be advised I protest their fee increase for gas service because:

despite the protests of many citizens and the Puyallups,. the company built their L N G plant right on top a known earthquake fault which dropped under water in 1949 and caused wide spread damage in Tacoma.  Such action in defiance of documented hazards is reprehensible as is the failures. of the council to force a change in this companie's plans.  The city should be prepared for a disaster made worse by the LNG plant!

Therefore,. I oppose their increase in price!

Ron Morrison
2495. No.  Stevens. St
Tacoma,. Wash.  98406

Global Cat Day is for ALL CATS - big and small. To best describe it as a "MINI-EARTH DAY"- centering around cats but also all flora and fauna - the reasoning is that if you protect their "HABITAT" you are protecting the Earth!

Indira Ghandi, before her death, set up a National Agency to protect the "Bengali Tiger" whose number declined by 95% (from 40,000 to just 2,000 today). She set up 51 "TIGER PRESERVES" staffed by hundreds of armed rangers to protect against further poaching. Other big cats are in need of similar protection. This is a example of what Global Cat Day is about. Attached is a story about the local Humane Society and a Animal Control officer who saved to abused kittens lives twice - another example for "FELINE ADVOCACY".

Sincerely,
Michele Reich

# The Humane Society — Tacoma & Pierce County

# Injured Kittens Need You

These babies weighed less than a pound and were in horrific pain. With just a glance, we could quickly see why.

**Both kittens' left rear paws were missing. In their place were open wounds, raw and infected.**

The veterinary team at the Humane Society for Tacoma & Pierce County jumped into action with medication to ease their discomfort and begin the fight against the infections. But complications arose when we saw the kittens move around using their sore stumps, causing further irritation with every step.

Without quick intervention, we didn't know if these kittens would ever be able to live a normal, pain-free life. The only solution and their best chance for survival was to perform an amputation further up their legs, to help them adapt to living as tripods.

**So many animals like these kittens come to us with uncertain pasts, but with your help, we can ensure they get the happy futures they deserve.**

Can we count on you to save Pierce County's animals in need? Just $25 or whatever you're inspired to give will provide care for those who need help right now.

The two kittens, now named Foxtrot and Echo, recovered from their amputation surgeries in an experienced foster home. Soon the pair were running, climbing, and playing as any kitten should! The sweet babies adapted so well that we could hardly remember the trauma they had been through only weeks before.

Once fully recovered, Foxtrot and Echo were finally ready to head to their new home. And the best part? The Animal Control Officer who brought the kittens to the shelter decided to adopt them!

**Your ongoing support has a powerful impact on the lives of so many animals in our community. But, while we celebrate each and every happy ending, we can't forget the animals who still need help now... and helpless animals who will suffer in the months ahead.**

**Please send in your best donation today to help homeless animals, like Foxtrot and Echo, who have nowhere else to turn. You can give them a voice and a future.**

# HELL NO

(to the tune of Harry Belafonte's Banana Boat song)
10.10.2023 | Tacoma City Council Meeting

*CHORUS:*
*Hell no, oh HELL NO!*
*(This warehouse scheme is a no-go!)*
*Hell no, oh HELL NO!*
*(This warehouse scheme is a no-go!)*

Hey City Council, this plan is no solution.
(This warehouse scheme is a no-go!)
Hundreds more trucks, more traffic, and pollution
(This warehouse scheme is a no-go!)

*CHORUS:*
*Hell no, oh HELL NO!*
*(This warehouse scheme is a no-go!)*
*HELL no, OH HELL NO!*
*(This warehouse scheme is a no-go!)*

We're tired and we're angry,
and we're thoroughly fed up!
A real health study is what we need.
Elections are coming, you'd better listen up!
It's not about jobs, it's all about greed.

*CHORUS:*
Hell no, oh HELL NO!
(This warehouse scheme is a no-go!)
HELL no, OH HELL NO!
(This warehouse scheme is a no-go!)

The planet is a-warming,
it's getting much too hot!
This warehouse scheme is a no-go!
Ya wanna pave our aquifer?
We're telling you "NOT!"
*[end]*

**Raging Grannies**
*of Tacoma, Washington*

# NO DAMNED WAREHOUSE

(to the tune of Joanie Mitchell's Big Yellow Taxi)
10.10.2023 | Tacoma City Council Meeting

They wanna pave paradise,
and put up a parking lot.
To build a mega-warehouse,
and 20 acres of parkING spots.

*CHORUS:*
*Don't it always seem to go?*
*The City passed this on the down-low.*
*They're paving our green space,*
*But we all say hell no!*
*(Oooh no no no no, Ooooh no no no no)*

With health disparities,
the neighbors are in distress
No one deserves this,
why did they skip a health... E..I..S?

*CHORUS:*
*Don't it always seem to go?*
*The City passed this on the down-low.*
*They're paving our green space,*
*But we all say hell no!*
*(Oooh no no no no, Ooooh no no no no)*

We know what that means,
thousands more trucks every day.
Idling at stop lights,
passing schools and dayCARES on their way.

CHORUS:
Don't it always seem to go?
The City passed this on the down-low.
Let's tell all our neighbors,
this scheme is just a no-go!
Tell everybody, this scheme is just a no-go!
*[end]*

**Raging Grannies**
*of Tacoma, Washington*

10th October

# WHD
**World Homeless Day**

## Tacoma Pierce County Coalition to End Homelessness

# WORLD HOMELESS DAY EVENT

PIERCE COALITION TO END HOMELESSNESS ♥ HOPE BUILDER

# Tuesday, October 10, 4:30 pm

On October 11th 2022, the Tacoma City Council passed Second Amended Substitute Ordinance 28831 (the camping ban). The ordinance: "prohibits camping and the storage of personal belongings in a 10-block radius around temporary shelters in Tacoma as well as Aspen Court (a City-permitted emergency and transitional housing facility) and all public property within 200 feet of Tacoma's mapped rivers, waterways, creeks, streams, and shorelines."

## on the anniversary of Tacoma's camping ban....

# REALITY CHECK -- WHAT HAVE WE ACHIEVED?

## The Price we ALL pay to enforce Camping Bans

*Encampment sweeps are counterproductive, harmful, and DO NOT reduce homelessness. Resources directed toward making homelessness less visible would be better used to produce shelter options that actually reduce homelessness. Why are camping bans - and the sweeps used to enforce them - so harmful?*

1. *Sweeps undermine outreach efforts.* The path to housing and financial stability is built on trust and follow-up. After a sweep it takes time to locate the person seeking services.
2. *Public health impacts of sweeps* go beyond the problem of providing consistent care for people with serious medical or behavioral conditions. Constant movement disrupts community, increases loss and damage of basic survival gear, and increases vulnerability to illness.
3. *Street deaths.* Unsheltered people live shorter lives (on average 30 fewer years) than housed people. During sweeps personal safety is lost, along with trust in service providers and public agencies.
4. *Forced migration in inclement weather.* This compounds the harms inherent in the sweeps.
5. *Risk of litigation against Tacoma.* The ordinance effectively bans universal, unavoidable human survival conduct on most public land in the city. An unsheltered person at risk of hypothermia is in violation of the ordinance as soon as they wrap a blanket or tarp around themselves and lie down. The money spent to defend inhumane policies will be better spent on shelter creation.

## See the flip side for better ways to spend our money. . .

### Additional Resources

**Tacoma Pierce County Coalition to End Homelessness (www.pchomeless.org):** Includes links to local meetings and events and serves as an on-line hub for individuals, non-profit organizations, government agencies, faith communities, and community businesses working together to end homelessness.

**Root Causes of Homelessness:** University of Washington professor and author, Gregg Colburn, offers a compelling analysis of the root causes of homelessness in our region in this 8 minute video clip. See link on pchomeless.org website.

**Issue Brief:** (December, 2022). Impact of Encampment Sweeps on People Experiencing Homelessness. National Healthcare for the Homeless. (nhchc.org/wp-content/uploads/2022/12/NHCHC-encampment-sweeps-issue-brief-12-22.pdf)

10th October

# WHD
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# Tiny Forests with Big Benefits – New York Times Aug. 24, 2023

*By Cara Buckley*

Native plants crowded onto postage-stamp-size plots have been delivering environmental benefits around the world — and, increasingly, in the U.S.

The tiny forest lives atop an old landfill in the city of Cambridge, Mass. Though it is still a baby, it's already acting quite a bit older than its actual age, which is just shy of 2. Its aspens are growing at twice the speed normally expected, with fragrant sumac and tulip trees racing to catch up. It has absorbed storm water without washing out, suppressed many weeds and stayed lush throughout last year's drought. The little forest managed all this because of its enriched soil and density, and despite its diminutive size: 1,400 native shrubs and saplings, thriving in an area roughly the size of a basketball court.

It is part of a sweeping movement that is transforming dusty highway shoulders, parking lots, schoolyards and junkyards worldwide. Tiny forests have been planted across Europe, in Africa, throughout Asia and in South America, Russia and the Middle East. India has hundreds, and Japan, where it all began, has thousands.

Now tiny forests are slowly but steadily appearing in the United States. In recent years, they've been planted alongside a corrections facility on the Yakama reservation in Washington (https://www.sugiproject.com/projects/healing-forest), in Los Angeles's Griffith Park and in Cambridge, where the forest is one of the first of its kind in the Northeast.

"It's just phenomenal," said Andrew Putnam, superintendent of urban forestry and landscapes for the city of Cambridge, on a recent visit to the forest, which was planted in the fall of 2021 in Danehy Park, a green space built atop the former city landfill. As dragonflies and white butterflies floated about, Mr. Putnam noted that within a few years, many of the now 14-foot saplings would be as tall as telephone poles and the forest would be self-sufficient.

Healthy woodlands absorb carbon dioxide, clean the air and provide for wildlife. But these tiny forests promise even more.

They can grow as quickly as ten times the speed of (https://daily.jstor.org/the-miyawaki-method-a-better-way-to-build-forests/) conventional tree plantations, enabling them to support more birds, animals and insects, and to sequester more carbon, while requiring no weeding or watering after the first three years, their creators said.

Perhaps more important for urban areas, tiny forests can help lower temperatures in places where pavement, buildings and concrete surfaces absorb and retain heat from the sun.

"This isn't just a simple tree-planting method," said Katherine Pakradouni, a native plant horticulturist who oversaw the forest planting in Los Angeles's Griffith Park. "This is about a whole system of ecology that supports all manner of life, both above and below ground."

The Griffith Park forest occupies 1,000 square feet, and has drawn all manner of insects, lizards, birds and ground squirrels, along with western toads that journeyed from the Los Angeles River, Ms. Pakradouni said. To get to the forest, the toads had to clamber up a concrete embankment, traverse a bike trail, venture down another dirt embankment and cross a horse trail.

"It has all the food they need to survive and reproduce, and the shelter they need as a refuge," Ms. Pakradouni said. "We need habitat refuges, and even a tiny one can, in a year, be life or death for an entire species."

Known variously as tiny forests, mini forests, pocket forests and, in the United Kingdom, "wee" forests, they trace their lineage to the Japanese botanist and plant ecologist Akira Miyawaki, who in 2006 won the Blue Planet Prize, considered the environmental equivalent of a Nobel award, for his method of creating fast-growing native forests.

Dr. Miyawaki, who died in 2021 at the age of 93, developed his technique in the 1970s, after observing that thickets of indigenous trees around Japan's temples and shrines were healthier and more resilient than those in single-crop

According to Mr. Bleichrodt, a 2021 university study of 11 Dutch mini-forests found over 1,100 types of plants and animals at the sites — kingfishers, foxes, hedgehogs, spider beetles, ants, earthworms and wood lice.

"A Miyawaki forest may be like a drop of rain falling into the ocean," Dr. Fujiwara wrote in an email, "but if Miyawaki forests regenerated urban deserts and degraded areas around the world it will create a river."

"Doing nothing," she added, "is the most pointless thing."

*Cara Buckley is a climate reporter who focuses on people working toward solutions and off-the-beaten-path tales about responses to the crisis.*


## From the Comments:

There is also an organization called Home Grown National Parks which encourages people to plant native species to create biodiversity. You can do this one plant at a time to get on their map.
https://www.homegrownnationalpark.org/

-----

There are three of these planted by the Berkeley Unified School District spearheaded by a science teacher! They are growing really quickly. https://www.berkeleyside.org/2022/12/08/miyawaki-pocket-forests-berkeley-unified-school-district

----

G. Pollard, UK Trees do a lot more than absorb CO2 and provide wildlife habitats; they also help regulate the water cycle. They take up groundwater through their roots and recycle it through the leaves as water vapor, laden with various particles that helps form clouds and rain over the forests. Sunlight turns CO2 and mineral-rich groundwater into plants and trees. Forests play an enormous role in regulating the planet's temperature though water and its phases - vapor, liquid, ice. Deforestation causes droughts and floods, and urbanisation increases atmospheric heat content dramatically. The world needs economical Miyawaki forests to help offset the effects of our changing climate - particularly in urban areas. The world needs the big forests too

----

Seattleites and residents of Western Washington : this process of habitat restoration with native plants is not expensive . Our County Conservation districts have annual native plants sales . In my case I use King County Conservation District and I planted over 2.000 native plants on my 3/4 acre for less than $3,000. They are bare root with no soil and no pots so you should get them planted within 48 hours of pick up . I had a planting party with 30 friends and family and we had all 2,000 plants planted by 3 pm one Sunday . All 2,000 of the plants fit in the back of my SUV with room to spare and I didn't have any pots to repurpose . For the sloped sections we had built trail systems for future maintenance and enjoyment . I replaced a monoculture lawn with a 5 seed " lawn" ( I now call it a meadow ) mix from Nicols Garden Nursery in Oregon. It's lush and full of bees . Go Native!

*[Handwritten: 10/10/23 Community Forum Kit Burns]*



*[Handwritten: Bridge Industrial ...]*

**Figure 1:** Project Site Vicinity

N
NOT TO SCALE

# BRIDGE INDUSTRIAL - LU21-0125

Bellarmine PREP

SR - 16

TRUCK ACCESS

S UNION AVENUE

To PORT of TACOMA

S 35TH ST

12A WELL

9A WELL

Jennie Reed Elem

Bldg "A"

S 38TH ST

4A WELL

TRUCK ACCESS

I - 5

SITE

Bldg "B"

11A WELL

6B WELL

Bldg "C"

S 47TH ST

S 48TH ST

S 50TH ST

GIADRONE MS

Bldg "D"

South Park

ALPHABET PRE-SCHOOL

S 56TH ST

EDISON ELEMENTARY

S. MADISON ST
S. MONROE

S. BURLINGTON WAY

S. WASHINGTON

S. TACOMA WAY

**Legend:**

- **X** TRAFFIC SIGNAL INTERSECTION
- **...** POSSIBLE SECONDARY ROUTE
- ⫣ ACTIVE TRACKS
- ▬ ▬ PROPERTY BOUNDARY

DRAWING → BY Kit Burns

SEPTEMBER 14, 2023

44. The project will comply with TMC 13.06.510 Off-street parking and storage areas.

45. Traffic is regulated by the *Traffic Control Handbook, TMC Title 9 public Ways, TMC Title 10 Public Works, TMC Title 11 – Traffic;* and City of Tacoma Traffic Engineering project review.

46. A Traffic Impact Analysis (TIA) was completed in June 2019 by Heath and Associates, Inc. No operational deficiencies were identified and the study intersections are shown to adequately support the incoming project's vehicular demands. Forecast 2022 PM peak hour LOS and delays are summarized in Table 3 of the study which indicate operations to remain at LOS A for the accesses and the primary intersection (S Burlington Way and S 56th St) receiving project traffic. (Exhibit A).

**Jeremiah Saucier**  Mayor & Councilmembers

My name is Jeremiah Saucier and I am the owner of Crossroads Treatment Center which is across the street from Aspen Court. I am also the Vice President of the Hosmer Business Association and I am coming to speak to you about people who need your help. The City has committed and spent millions on trying to address homelessness as well as substance abuse but there are many hands in the pot and one hand is not seeing the other. ~~You are right,~~ there is not enough permanent housing available. ~~There are also not enough people getting the service~~s that they ~~need or access~~ to the many programs that have been created. Use this emergency situation to bring everyone to the room, to Aspen Court, and get these people, your citizens placed into permanent housing. Since they have been at Aspen Court, these people have already received critical time intervention and they have been there for more than 90 days. They are just running out of time because of the Aspen Court Shelter Deadline of December 31, 2023. Are you able to extend the contract with Aspen Court? If not, you could get service _plus_ providers together, at Aspen Court to meet with these individuals. Make it happen ~~this month~~ _soon_. If you do not take action, you will be putting at least 50 people out onto the street on December 31st and businesses will be at risk of closing and you will see crime rising again. When Aspen Court opened, promises were made that no one would be put out onto the street on Hosmer. Putting these people out will result in all the hard work wasted that has been started. Don't let these people be put out on the street and don't let our  cleaning on the South End be wasted. We, the businesses and neighbors on Hosmer are asking you to please save our area.  Thank you.

10/10/23
community forum
Patrida Berry

## Ryan's Park

Ryans Park is a tucked away community park established in 1992. The park was originally called Celebration Park and many maps still show that name. The park has several access points from the surrounding neighborhoods. One side of Ryans Park is also a greenbelt with a short walking trail and seasonal creek. The park amenities include a large field for activities, a large kids play area, picnic tables, and bbq grills. Ryans Park was renamed in 2009 for Ryan Alan Hade, a seven year old who was molested and left for dead in the park by a violent sex offender. In response, Washington adopted the Community Protection Act of 1990, the nation's first state law for the indefinite civil confinement of sexual predators. Ryan Hade died at age 23 when his motorcycle collided with a pickup truck.
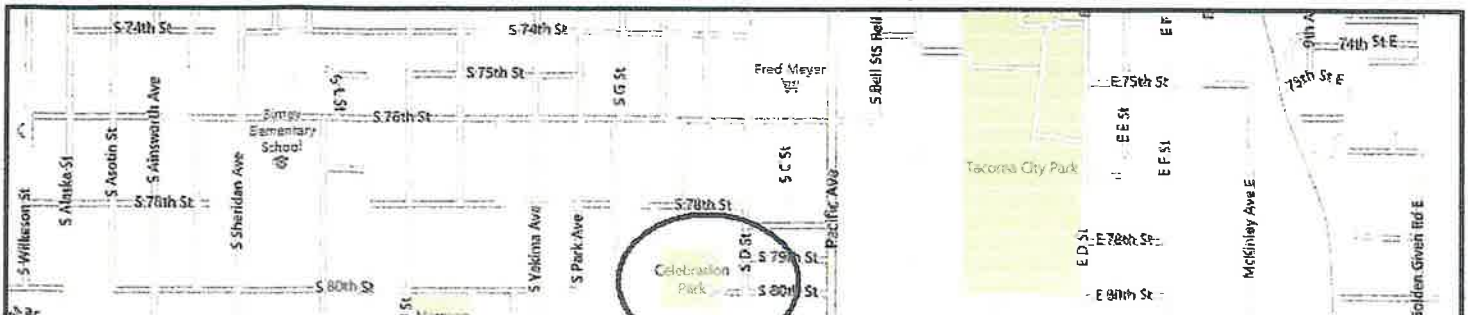
Playground at Ryans Park

Ryans Park field

Trail in Ryans Park to access 78th Street

Ryans Park field



Trail in Ryans Park to access 78th Street

# THE SPOKESMAN-REVIEW

Washington     Idaho

## Park gathering recalls victim of sex attack

Sat., May 23, 2009

🐦                                                  ✉                                                  ⑤

**Mike Archibold**
News Tribune

TACOMA – For years, few people knew Ryan Alan Hade's name.

But what happened to him on a May afternoon in 1989 changed American law forever.     ✕

For privacy reasons, he became known as "the little Tacoma boy" who was raped, strangled and mutilated by a convicted sex offender. His tragedy garnered worldwide attention and support.

On Wednesday, 20 years later to the day and on the site where the attack occurred, two dozen family members, friends, community leaders and safe-neighborhood advocates gathered at Celebration Park at South D and 80th streets.

They came together for a moment of remembrance.

"What we are here for is not in sorrow, but in celebration of a tragedy that occurred on this site," Tacoma City Councilwoman Connie Ladenburg said.

She lived a mile from the site in 1989 and became active in South End neighborhood issues and in reclaiming the site as a park after the attack. She announced that she will ask the City Council to rename Celebration Park as Ryan's Park.

"I don't expect anyone to be against it," she said. Ladenburg also read a proclamation from Tacoma Mayor Bill Baarsma declaring

Over the years more than $1 million poured in from around the world into a trust fund to help him pay for medical and counseling expenses. Hade left the remainder of his trust, more than $800,000, to the Tacoma Community Foundation to administer.

The painful bookends of his short life were not talking points this day in the grassy park where blackberry bushes once grew 20 feet tall. The stories told by those who lived them were how a tragedy transformed itself into something good and lasting.

Ladenburg's husband, John, was Pierce County prosecutor in 1989 and handled the case that put Ryan's 39-year-old assailant, Earl Shriner, away for 131 years. Shriner is now in an out-of-state prison.

"Most people do not recognize the profound effect this case had on American law" in the past 20 years, John Ladenburg said.

It helped convince lawmakers that sexual predators must be treated differently than other criminals, he said.

He ticked off other changes connected to the case: longer sentences for sexual predators, creation of special civil commitment centers for sexual predators, a "two-strikes-and-out" law for sexual predators, and neighborhood notifications when convicted predators set free are living in their midst.

John Ladenburg said he was aware of Shriner before the attack on Hade and had put him in prison once before. He recalled being told by state prison officials that Shriner had told others in prison that when he was released he would offend and mutilate little boys.

He even drew pictures of what he would do.

Ladenburg said the county worked with prison officials to make sure Shriner served every day of his prison term without time off for good behavior. The former prosecutor said he tried to have Shriner committed as mentally ill but "the law would not allow it."

Changes in the law came too late for Hade.

Dick Mansfield, who still lives across the street from where the boy was attacked, recalled finding Hade that day. Huddled in some bushes, the 7-year-old was naked and covered with mud.

"I knelt down beside him," Mansfield said. "He was so scared. He couldn't respond to questions."

Mansfield picked the boy up, carried him to his house and called 911.

On Wednesday, Connie Ladenberg recalled the day 600 people, including 300 students from nearby Baker Middle School, showed up to clear the area of blackberry bushes.

The neighborhood turned "The Trails," as the area was known to local kids, into Celebration Park, which today is a grassy meadow with a creek and play equipment.

The attack on Hade turned his mother, Helen Harlow, into an activist on behalf of abused children and changes in sexual predator laws. She formed the Tennis Shoe Brigade that famously dumped thousands of kids' sneakers on the state Capitol to push for those changes.

Connie Ladenburg ended the remembrance with a charge to all who were there:

"Remember when you go back to your neighborhoods, keep your eyes open; keep your doors open; and take care of our kids."

## THE SPOKESMAN-REVIEW

### Local journalism is essential.

Give directly to The Spokesman-Review's Northwest Passages community forums series -- which helps to offset the costs of several reporter and editor positions at the newspaper — by using the easy options below. Gifts processed in this system are not tax deductible, but are predominately used to help meet the local financial requirements needed to receive national matching-grant funds.

### Rob Curley

Spokesman-Review editor Rob Curley loves to talk with people and learn about their lives, whether it's a best-selling author or a stranger he meets downtown on his walk to lunch. It's that inquisitive nature combined with a playful sense of storytelling that helps make our newspaper different than most.

# THE NEWS TRIBUNE

Part of the McClatchy Media Network

MATT DRISCOLL

Matt Driscoll is a News Tribune columnist.

## Her son was 'The Little Tacoma Boy.' Now, she wants to revisit sex offender laws she helped pass

BY MATT DRISCOLL

UPDATED MAY 19, 2019 5:14 PM

The anniversary is Monday, though calling it an anniversary doesn't feel right. That sounds celebratory. It's not.

May 20, 1989. Thirty years, this year. For Helen Harlow, it's a date she'll never escape, not that she's trying to — at least not now. It's too late for that.

May 20, 1989 was the day her 7-year-old son Ryan, in the public eye, became "The Little Tacoma Boy."

If you're of a certain age, you already know the story. If you're too young to remember, you've experienced the ramifications.

**TOP VIDEOS**



Family of Manny Ellis hold press conference after ongoing homicide trial

Thirty years ago Monday was the day Ryan Hade rode his bike into a wooded lot near his home in the Fern Hill neighborhood of Tacoma — as he had so many times before — and encountered 39-year-old Earl Kenneth Shriner, already a repeat sexual offender.

Thirty years ago Monday was the day Shriner raped, assaulted and violated Ryan so savagely that the whole world was forced to take notice.

Thirty years ago Monday was the day everything changed for Harlow. It was the day everything changed for Tacoma. And it was a day everything started to change for sex offenders in Washington state.

Ryan Hade died in 2005, at the age of 23. It was a tragic motorcycle accident, near his home in Yelm. After Ryan's death, the world at large finally learned his name.

"I got shortchanged on that," Harlow says of her son's death. "He was such a loving son, and I knew he was going to be a loving father. He was going to have a wonderful life. And it didn't happen."

Sitting at a lunch table at Freighthouse Square on a recent Tuesday afternoon, Harlow, now 69 and a recently retired tax preparer, recounted all of it. She remembered the crime, the aftermath and the unsought notoriety. She remembered the changes in state law she helped usher in, including the indefinite confinement of sexual predators.

In the aftermath of Hade's 1989 assault, Harlow was everywhere — on TV or helping to organize the Tennis Shoe Brigade's advocacy efforts in Olympia. For a time, Harlow's voice and story were inescapable.

Along with Ida Ballasiotes, a Seattle mother whose daughter Diane was murdered in 1988 by a sex offender on work release, Harlow's willingness to be a public face for families who had endured unspeakable tragedies helped forever change the way Washington deals with sexual predators.

That willingness began to wane as Hade grew older. The notoriety was too much, Harlow says. Kids at Ryan's middle school would see her on the nightly news and

make the connection.

Recently, Harlow has looked back on the decades since she's been in the spotlight, Ryan's death and her recent decision to try to step back into the public arena — in part, to honor the legacy of her son.

Harlow says it's a legacy she sees all around her, even today, and it makes her proud.

It's visible in the work being done at places like The Mary Bridge Children's Advocacy Center, she says. And it's particularly clear at HopeSparks, which provides mental health services to youth and families, where Ryan's Wing is named in her son's honor.

Each year since 2007, dividends from the Ryan Hade Endowment Fund go to HopeSparks for this work. It's fitting, since the agency — which was formerly called the Child and Family Guidance Center — is where Ryan received counseling after his attack.

A trust fund was established in the aftermath of Hade's assault after financial donations started pouring in from around the world. The trust required that if Hade died before the age of 35 and had no children, the remaining funds would be turned over to the Greater Tacoma Community Foundation, with the money, per Hade's wishes, going to "the benefit of other abused or disfigured children, in perpetuity."

Since 2017, in part because of the money it received from the Ryan Hade Endowment Fund, according to Hope Sparks CEO and President Joe LeRoy, the agency served more than 600 referrals from the Mary Bridge Child Advocacy Center, with no one turned away.

"Being a dad and having put myself in Helen's shoes, I can't imagine having my child assaulted in the manner (Hade) was, and then losing him later in life. It's just tragic to think about that," LeRoy says. "For (Hade) to have the foresight as a young man to think about, 'What do I want kids to have in the future?' Who does that?

"I feel like since I've become the CEO of this organization, I've been handed the honor to help him continue his service and wishes for what he wanted in the world. It's been critical for me to get it right."

For Harlow, getting it right is also a driving force. After playing an instrumental role in toughening Washington's laws related to sexual predators 30 years ago, she sees successes but also work that remains.

For starters, Harlow wants to take a closer look at sex offender registration laws, and specifically how closely — or how well — the state is monitoring transient offenders.

On the other end of the spectrum, she wants to be part of a conversation about how the state can improve the ways confined sex offenders are dealt with.

In 1990, the Special Commitment Center on McNeil Island was established as a place to indefinitely confine sexual predators, as the laws Harlow helped pass called for.

Today, it's home to more than 200 such offenders.

To Harlow, that's a sign of success, but also potentially failure.

"That tells me the concept is working, but it's only working to get (offenders) in. How is it working to get them out?" Harlow says. "Some of them are going to change."

"I'm open to going back into every single piece and part that we started with and saying, 'What is going on now? What needs to go on? Why have some things we've tried not worked? What else can we do?" she adds.

When it comes to where things go from here, Harlow admits she's not sure. She's taking it day by day.

She is certain about one thing, however.

"What I want to do now is be visible again. It's partly because of Ryan, but it's also because that's' the kind of person I am," Harlow says.

"I've been an advocate and activist all my life. ... I'm doing what I expected he would have done."

Last year 165 people Homeless people died on the streets. While speaking to the city Council I told them to stop killing our people. But they continued to sweep people off the streets, … and then they passed the camping ban. Maybe they didn't believe me …

When asked to explain the effects of Homeless Sweeps Dr. Joshua Barocas, principal investigator of the study and infectious disease doctor and associate professor at the University of Colorado Anschutz Medical Campus, told *Denverite a Denver newspaper*. "To put that a different way, it means our states and our cities are literally killing people with this."

The City Council put in their "Strategic Directions" the following:

Decrease in (visible, unsanctioned) encampments, including fewer RVs and cars. *We have more people living in their cars and RVs being used for shelters than last year.*

Increase the number and diversity of shelter and reduce barriers to shelters. *Some work has been done.*

Zero unsanctioned encampments. *We now have people hiding throughout Tacoma. The number far exceeds the encampments that were there before the camping ban.*

Decrease blight and environmental hazards-trash, human waste, graffiti, etc. *These effects have not been decreased, you made it harder to pick up the trash because it is spread out at the individual hidden encampments.*

Zero homeless deaths. *Last year 165 Homeless People died. This year through September; 225 people died homeless. If the rate of death and reporting continues; over 300 homeless people will die this year.*

The City Council Strategic Direction on Homelessness is not working. I call on you to rescind the camping ban and sweeps.

As a Chaplain and Pastor to the Homeless … I will say it again;

Stop Killing My People!

"Mayor, Members of the City Council:

My name is Dr Joanne Iverson,

Thank you for the opportunity to speak on behalf of persons living homeless and vulnerable. As a Pierce County Medical Reserve Nurse, I have volunteered and practiced healthcare here for nearly 35 years. My insights are focused on the effect homelessness has on healthcare outcomes.

Research supports the anecdotal data that has been collected on the population of unhoused persons in our area There exists great health disparities between persons experiencing homelessness and those living housed.

One of the most recent published findings from NIH (2021) provides a compilation of nearly 2 million health records that were analyzed over a 20-year period. In many categories of health, those living homeless have higher rates of worsening health outcomes than their housed neighbors. An additional study published from the University of Washington in 2020 documents significantly higher rates of disease and death caused by cardiovascular disease, accidents, violence, hypothermia, falls, suicide, homicide and substance use in persons living unsheltered on our streets. Locally, you can visit any area hospital to witness this first hand.

I have personally met those living on the streets, sick and alone, who later died. The secondary trauma of this experience is nothing less than a moral injury to healthcare providers.

Camping bans can separates those who need help from the resources they need to escape homelessness and yet, I acknowledge the tension that encampments have on the general public. You are in a tough position, but there are viable, research-based solutions that can balance the care of the sickest and poorest with the health and safety of the community as a whole There are enough of us here today who have come together to seek these solutions and I believe solutions are possible with all of us working together."

| | Sheltered (Emergency Shelter, Transitional Housing, and Safe Haven) | Unsheltered | Total |
|---|---|---|---|
| Adams County | < 11 | 0 | < 11 |
| Asotin County | 47 | 80 | 127 |
| Benton County | 89 | 37 | 126 |
| Chelan County | 306 | 125 | 431 |
| Clallam County | 126 | 78 | 204 |
| Clark County | 628 | 672 | 1300 |
| Columbia County | 0 | 30 | 30 |
| Cowlitz County | 181 | 137 | 318 |
| Douglas County | 30 | 0 | 30 |
| Ferry County | < 11 | < 11 | < 11 |
| Franklin County | < 11 | 15 | * |
| Garfield County | 0 | < 11 | < 11 |
| Grant County | 101 | 128 | 229 |
| Grays Harbor County | 92 | 110 | 202 |
| Island County | 64 | 67 | 131 |
| Jefferson County | 47 | 79 | 126 |
| King County | 6464 | ** | ** |
| Kitsap County | 363 | 247 | 610 |
| Kittitas County | 35 | < 11 | * |
| Klickitat County | 12 | 15 | 27 |
| Lewis County | 93 | 60 | 153 |
| Lincoln County | 0 | 0 | 0 |
| Mason County | 135 | 246 | 381 |
| Okanogan County | 27 | 263 | 290 |
| Pacific County | < 11 | 69 | * |
| Pend Oreille County | < 11 | 15 | * |
| Pierce County | 2049 (6500) | 763 | 2812 |
| San Juan County | < 11 | 51 | * |
| Skagit County | 315 | 218 | 533 |
| Skamania County | < 11 | 52 | * |
| Snohomish County | 1592 | 691 | 2283 |
| Spokane County | 1435 | 955 | 2390 |
| Stevens County | 34 | 41 | 75 |
| Thurston County | 303 | 437 | 740 |
| Wahkiakum County | < 11 | 0 | < 11 |
| Walla Walla County | 103 | 80 | 183 |
| Whatcom County | 666 | 346 | 1012 |
| Whitman County | < 11 | < 11 | < 11 |
| Yakima County | 371 | 189 | 560 |
| Total | 14083 | 6316 | ** |

*(handwritten, right of Pend Oreille/Pierce rows):* 1851 ( 4300)  1005  1897

**\* Numbers than 11 or above 0 are suppressed for confidentiality. Also, totals are suppressed if the number can be determined by simple subtraction.**

**\*\* King County opted out of the unsheltered part of the PIT this year.**

*(handwritten table at bottom:)*

Disproportionate

| | 2023 | 2022 |
|---|---|---|
| Racial | 41% ↓ | 52% |
| Chronic | 25% ↑ | 23% |
| Household | 7% | 7% |
| Domestic violence | 8% ↓ | 20% |
| Unaccomp. Youth | 0 listed | 11% |
| 55 + | 22% ↑ | 0 listed |

| | Sheltered (Emergency Shelter, Transitional Housing, and Safe Haven) | Unsheltered | Total |
|---|---|---|---|
| Adams County | < 11 | 0 | < 11 |
| Asotin County | 47 | 80 | 127 |
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| Ferry County | < 11 | < 11 | < 11 |
| Franklin County | < 11 | 15 | * |
| Garfield County | 0 | < 11 | < 11 |
| Grant County | 101 | 128 | 229 |
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| Spokane County | 1435 | 955 | 2390 |
| Stevens County | 34 | 41 | 75 |
| Thurston County | 303 | 437 | 740 |
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| Total | 14083 | 6316 | ** |

* Numbers than 11 or above 0 are suppressed for confidentiality. Also, totals are suppressed if the number can be determined by simple subtraction.

** King County opted out of the unsheltered part of the PIT this year.

Without shelter, people die: disproportionate mortality rates among King County's homeless population, 2009 - 2019

Rachel Ariel Scott

A thesis submitted in partial fulfillment of the requirements for the degree of

Master of Public Health

University of Washington

Spring 2020

Committee:
Amy Hagopian
Michele Marchand
Bert Stover
Clarence Spigner

Program Authorized to Offer Degree:

Public Health

University of Washington

**Abstract**

Without shelter, people die: disproportionate mortality rates among King County's homeless
population, 2009 - 2019

Rachel Ariel Scott

Chair of the Supervisory Committee:
Amy Hagopian
Department of Health Services

People living without benefit of decent housing suffer from a wide range of life-shortening
health conditions and die younger than the general population. We created a dataset constructed
from an ongoing list of homeless decedents who died in King County, maintained by a Seattle
advocacy organization (Women's Housing Equality and Enhancement League), and the King
County Medical Examiner's death certificate data, supplemented by in-depth mortality case
notes. Medical and contextual information were reviewed and cross-checked to ascertain causes
and modes of death for each case. The dataset for this study includes decedents who were
presumed to be homeless upon death, and who died in King County between 2009 and 2019.
Data were analyzed to observe cause-specific mortalities by year and compare to Washington
state's general population. The average age at death among decedents in our study was 48.9, in
comparison to the Washington state life expectancy of 80.3 years. Using the annual Point in
Time Count as our denominator, we estimated the non-age-adjusted all-cause mortality rate
among King County's homeless population to be, on average, 1.5x that of the general population
for the eleven-year period. Homicide rates were, on average, 19x higher among homeless than
the general population, and suicide was 5.5x times higher than the general population. Roughly

# Introduction

People living without benefit of decent housing suffer from a wide range of life-shortening health conditions. Living unsheltered and in unstable conditions make individuals particularly vulnerable to weather, vehicles, and the actions of other humans. Those experiencing homelessness also have reduced access to health services, employ coping mechanisms and health behaviors with predictably adverse outcomes, such as substance use (Robertson, Zlotnick, & Westerfelt, 1997), are vulnerable to the effects of excessive stress (Geronimus, Hicken, Keene, & Bound, 2006), are more likely to be involved in and targeted by the justice system (Mogk, Shmigol, Futrell, Stover, & Hagopian, 2019), and in general suffer significantly poorer health outcomes until they die younger (Barrow, Herman, Cordova, & Struening, 1999; Kasprow & Rosenheck, 2000). Seattle/King County, Washington has the third highest number of people experiencing homelessness in the US, after New York City and Los Angeles County.

Academic studies of homeless health and mortality tend to focus on cohorts of persons who utilize local homeless social or health services. Because a significant proportion of homeless people stay off the grid of service providers, they are not captured in these studies. For example, the Philadelphia Homeless Death Review (Philadelphia Department of Public Health, 2017) found nearly one in four decedents were unknown to city homeless service systems, including emergency shelter and street outreach services. These findings suggest that homeless death counts based on homeless service utilization may significantly underrepresent the true scope of homeless mortality.

A new dataset - which includes data on presumed homeless decedents regardless of service utilization - provides a much needed tool to facilitate a broader look at disproportionate mortality amongst homeless individuals in King County.

# Background

Housing status is a key predictor of health outcomes and life expectancy. Collecting mortality data and tracking changes in mortality rates are essential tools for revealing the health disparities that homeless individuals face, while providing evidence for much needed expansion of affordable housing. Studies indicate homelessness is linked with high morbidity rates and reduced life expectancies in comparison to the general population.

Homeless individuals die at an average of 51 years in Los Angeles, 49 years in Philadelphia, and 51 years in San Francisco, significantly shorter life spans than enjoyed by the average American (78.6 years) (LA County Department of Public Health, 2019; Philadelphia Department of Public Health, 2017; San Francisco Department of Public Health, 2019; Murphy, Xu, Kochanek, & Arias, 2018). US studies have found living unsheltered makes individuals especially vulnerable to extreme weather that lead to early death (Every, Richardson, & Osborn, 2019; Cusack, VanLoon, Kralik, Arbon, & Gilbert, 2013). An Arizona report found homeless individuals were overly represented among deaths related to heat exposure, while additional studies have shown high risk of skin cancer attributable to excessive sun exposure and limited use of sun protection (Putnam, Hondula, Urban, Berisha, Iniguez, & Roach, 2018; Truong, et al., 2018). A retrospective cohort study of homeless U.S. veterans found them nearly three times as likely to die as their housed counterparts (Schinka, Leventhal, Lapcevic, & Casey, 2018). A study of shelter users in New York City reported age-adjusted mortality rates four times higher

# Methods

This retrospective study explores cause of death for 1,271 decedents who died in King County between 2009–2019 and were *presumed homeless* upon death. As the Medical Examiner Office investigates only deaths under its jurisdiction, the count is likely an underestimate of the true number.

### Data sources

The King County Medical Examiner Office (MEO), which has intentionally tracked and reported on homeless deaths since 2002/2003, uses a mix of contextual clues as well as information provided by family members, friends, and witnesses to determine a decedent's presumed housing status. The MEO uses the federal definition of *homeless*-- "individuals without evidence of permanent housing who lived on the streets or stayed in a shelter, vehicle, or abandoned building at the time immediately preceding death" (Public Health – Seattle & King County, 2019b). This does not include formerly homeless individuals living in supportive or transitional housing, or in other unstable situations.

The data set was constructed by a team of UW MPH students in 2019, including the lead author of this paper, and was built from two sources. The first is a list of the names and details of homeless deaths reported monthly by the MEO to community stakeholders, which includes more than 20 variables, including the decedent's name, age, race, ethnicity, sex, death date, event address, and diagnostic cause of death.

The second data source includes notes on each death provided by the Seattle community organization WHEEL/Women in Black, based on information from people in the homeless community.

### Cause of death

We reviewed and cross-checked data abstracted from the additional narrative notes provided by both WHEEL/Women in Black and the MEO to create two variables characterizing the primary manners and causes of death. The first of these categorizes deaths as unintentional injuries, natural causes, drug-and-alcohol induced, homicide, suicide, or unknown/other.

We also created a second *subcategory* variable to add more detail. For example, within the category of *homicide*, subcategories included beaten, gun, stabbing, and other/unknown. When the manner or cause of death was uncertain (ex: bodies in advanced stages of decomposition), the deaths were classified as injury: other/unknown. Further, when the intentions of an action that resulted in death were unknown (ex: fall off bridge, struck by train), deaths were categorized as an unintentional injury unless there was reasonable evidence to presume suicide or homicide. An additional notes column flags potentially misclassified cases for future research efforts. It could be the case that drugs or alcohol played a role in chronic disease or accidental injury deaths, but nonetheless, we classified only clear overdoses and/or acute poisoning as "drug-and-alcohol induced."

We focus on injurious deaths in this analysis, including suicide, homicide, blunt force injuries caused by vehicles, and other instances where trauma is inflicted on the person. In general, deaths (or their immediately preceding incidents) must have taken place within King County to be included. More extensive methodology for reviewing case notes and classifying deaths is detailed in the Homeless Deaths Database Methodology document, developed by Kate Causey, MPH, with support from the other team members. This document is available upon request.

significance of any associations and t-tests to assess the significance of differences in age by demographic variables.

We constructed crude mortality rates for each category of death, for each of the years in our data set (2009-2019) and compared these to Washington state crude mortality rates. We also constructed standardized mortality ratios (SMR) for homicides, suicides, drug-and-alcohol induced deaths, and pedestrian deaths in the King County population.

# Results

A total of 1,271 cases were included in our analyses, encompassing all recorded King County homeless deaths 2009-2019. The average age at death was 48.9 (sd= 13). Average age at death was 44.8 (sd=14) for females, and 49.9 (sd=12.7) for males. Characteristics of the decedents included in our analysis are displayed in Table 1.

**Table 2: Demographics of King County homeless decedents, by year 2009-2019**

| | | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019* | All years |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Age | | | | | | | | | | | | | |
| | <18 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 2 | 1 | 6 |
| | 18-24 | 1 | 2 | 1 | 1 | 3 | 3 | 6 | 2 | 5 | 6 | 3 | 33 |
| | 25-44 | 39 | 31 | 18 | 27 | 49 | 33 | 67 | 66 | 76 | 75 | 75 | 556 |
| | 45-64 | 32 | 21 | 26 | 51 | 55 | 49 | 52 | 63 | 87 | 101 | 77 | 614 |
| | 65+ | 4 | 2 | 2 | 2 | 1 | 6 | 5 | 8 | 4 | 12 | 8 | 54 |
| | missing | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 4 | 8 |
| | Total | 77 | 56 | 47 | 82 | 108 | 92 | 130 | 141 | 174 | 196 | 168 | 1271 |
| Race/Ethnicity | | | | | | | | | | | | | |
| | AIAN | 3 | 4 | 2 | 4 | 10 | 3 | 7 | 11 | 11 | 7 | 9 | |
| | Asian/PI | 0 | 0 | 1 | 0 | 3 | 4 | 5 | 3 | 7 | 4 | 6 | ⤴ |
| | Black | 11 | 4 | 7 | 9 | 10 | 16 | 13 | 19 | 26 | 28 | 29 | ⤴ |
| | Hispanic/Lat. | 6 | 1 | 1 | 6 | 2 | 2 | 6 | 4 | 10 | 5 | 2 | ↙ |
| | White | 53 | 40 | 32 | 59 | 79 | 61 | 95 | 99 | 114 | 146 | 112 | ↙ |
| | Other | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 1 | 3 | 4 | 3 | |
| | missing | 4 | 7 | 2 | 4 | 4 | 5 | 3 | 4 | 3 | 2 | 7 | |
| | Total | 77 | 56 | 47 | 82 | 108 | 92 | 130 | 141 | 174 | 196 | 168 | 1271 |
| Sex | | | | | | | | | | | | | |
| ★ | Female | 8 | 15 | 10 | 11 | 18 | 12 | 27 | 26 | 32 | 36 | 40 | trending up |
| | Male | 69 | 41 | 37 | 71 | 90 | 80 | 103 | 114 | 142 | 160 | 128 | down. |
| | missing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | |
| | Total | 77 | 56 | 47 | 82 | 108 | 92 | 130 | 141 | 174 | 196 | 168 | 1271 |

*Note: 2019 data may be incomplete or under renewal for accuracy.*

In our dataset, the crude mortality rate (per 100,000) among men was 944 and 214 among women. Women represented only 18.4% of the decedents in our analysis but tended to die younger than men (44.8 years and 48.9 years respectively). The crude mortality rate (per 100,000) was 812 among white decedents, 1157 for black decedents, 41 for Hispanic/Latinx, 65 for AIAN, and 30 for Asian/PI.

### Causes of Death

The largest single category of death was "natural," at 34.5%, including chronic conditions such as diabetes mellitus, heart disease, pulmonary disease, cancer, and complications from chronic substance or alcohol use. A similar proportion of deaths were categorized as drug- or-alcohol induced, 33.52% of cases.

Injury deaths (15%), a focus of this paper, included traffic and train accidents, hypothermia, falls, and drowning. Among injury deaths, 30.3% (58/192) were traffic-related deaths (typically pedestrians or cyclists being hit by vehicles), 20% (40/192) were attributed to hypothermia, 13% (25/192) were caused by falls, and 5.7% (11/192) were drownings. Suicide accounted for approximately 7.3% of all homeless deaths, and homicide for 5.5%. Table 3 shows the numbers and total percentages of deaths attributed to each manner of death, by year. More than half (41/71) of all homicides were attributed to guns, and 18.3% (13/71) were stabbings. In 14% (6/41) of gun deaths, the firearm was discharged by a police officer.

**Table 3: Category of King County Homeless Death Causes by Year, 2009-2019**

| Year | Drug-and-Alcohol Induced | Homicide | Injury | Natural | Other/ Unknown | Suicide | Total |
|---|---|---|---|---|---|---|---|
| 2009 | 19 | 4 | 10 | 32 | 2 | 10 | 77 |
| 2010 | 19 | 4 | 13 | 14 | 2 | 4 | 56 |
| 2011 | 18 | 1 | 9 | 14 | 1 | 4 | 47 |
| 2012 | 28 | 2 | 11 | 33 | 4 | 4 | 82 |
| 2013 | 45 | 7 | 15 | 32 | 3 | 6 | 108 |
| 2014 | 27 | 4 | 13 | 34 | 6 | 8 | 92 |
| 2015 | 47 | 10 | 21 | 38 | 5 | 9 | 130 |
| 2016 | 37 | 8 | 22 | 60 | 5 | 9 | 141 |
| 2017 | 59 | 9 | 29 | 63 | 1 | 13 | 174 |
| 2018 | 65 | 11 | 29 | 74 | 3 | 14 | 196 |
| 2019 | 63 | 11 | 20 | 45 | 16 | 13 | 168 |
| Total | 427 (33.6%) | 71 (5.6%) | 192 (15%) | 439 (34.6%) | 48 (3.8%) | 94 (7.4%) | 1271 (100%) |

*Data source is King County Medical Examiner reports of presumed homeless deaths for the years 2009-2019, along with supplemental case notes provided by the Women's Housing Equality and Enhancement League.*

| 2015 | 0.34 | 10.00 | 29.27 | 11.13, 47.42+ | 1.57 | 9.00 | 5.74 | 1.99, 9.49+ |
|---|---|---|---|---|---|---|---|---|
| 2016 | 0.32 | 8.00 | 24.95 | 7.66, 42.24+ | 1.59 | 9.00 | 5.65 | 1.96, 9.34+ |
| 2017 | 0.43 | 9.00 | 20.89 | 7.24, 34.54+ | 1.99 | 13.00 | 6.53 | 2.98, 10.08+ |
| 2018 | 0.46 | 11.00 | 23.90 | 9.78, 38.02+ | 1.96 | 14.00 | 7.14 | 3.4, 10.87+ |
| 2019 | 0.44 | 11 | 25.19 | 10.30, 40.07+ | 1.94 | 13 | 6.71 | 3.06, 10.35+ |

*Data source is King County Medical Examiner reports of presumed homeless deaths for the years 2009-2019 and Washington State Department of Health, Center for Health Statistics. SMR, as portrayed, represents the number of observed homeless deaths for homicide and suicide in King County, compared to the general state population. When the Standardized Mortality Rate (SMR) is higher than 1.0, this represents a higher number of deaths than expected. For example, the 2018 homicide rate in King County is 23.9 times higher than would be expected for the statewide population.*

*\*Expected number of deaths based on WA state homicide mortality rate*
*^Observed number of deaths by homicide among KC homeless*
*+Statistically significant, $p < .05$*

Figures 3 and 4 display a comparison of crude homicide and suicide rates, respectively, between the King County homeless population and the Washington state general population over time.

**Figure 3: King County Homeless and Washington State Homicide Mortality Rates (2009-2019)**
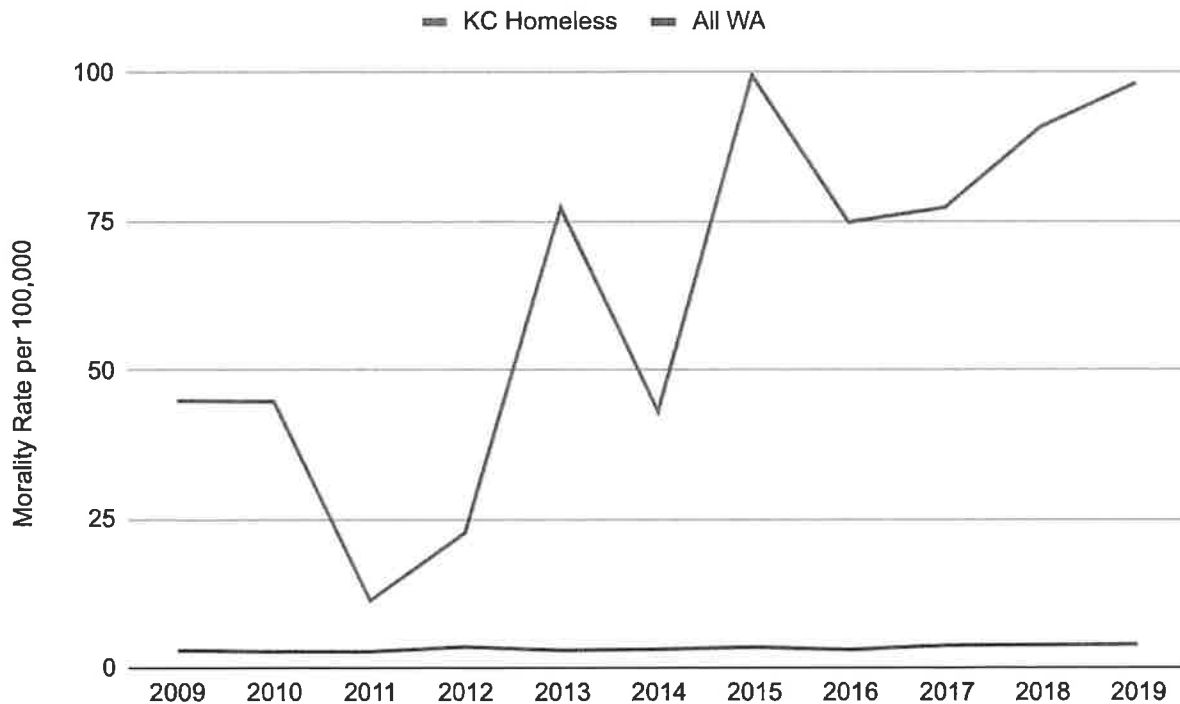


*Data source is King County Medical Examiner reports of presumed homeless deaths for the years 2009-2019, along with supplemental case notes provided by the Women's Housing Equality and Enhancement League, and Washington State Department of Health, Center for Health Statistics.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **2012** | 2.57 | 28 | 10.88 | 6.85, 14.91+ | 0.14 | 3 | 21.23 | -2.79, 45.26 |
| **2013** | 2.69 | 45 | 16.70 | 11.82, 21.58+ | 0.11 | 4 | 36.78 | .74, 72.83 |
| **2014** | 2.80 | 27 | 9.65 | 6.01, 13.29+ | 0.17 | 4 | 23.91 | .48, 47.34 |
| **2015** | 3.26 | 47 | 14.41 | 10.29, 18.53+ | 0.20 | 3 | 14.93 | -1.96, 31.82 |
| **2016** | 3.3 | 37 | 11.2 | 7.59, 14.81+ | 0.21 | 7 | 32.75 | 8.49, 57.01+ |
| **2017** | 3.9 | 59 | 15.11 | 11.26, 18.97+ | 0.28 | 9 | 32.21 | 11.17, 53.25+ |
| **2018** | 4.1 | 65 | 15.85 | 12.00, 19.71+ | 0.28 | 12 | 43.08 | 18.70, 67.45+ |
| **2019** | Pending | 63 | Pending | Pending | Pending | 6 | Pending | Pending |

*Data source is King County Medical Examiner reports of presumed homeless deaths for the years 2009-2019 and Washington State Department of Health, Center for Health Statistics. SMR, as portrayed, represents the number of observed homeless deaths for drug and alcohol induced deaths in King County, compared to the general state population. When the SMR is higher than 1.0, there is a higher number of deaths than is expected. For example, the 2018 drug and alcohol death rate in King County is 15.85 times higher than would be expected for the statewide population.*

*\*Expected number of deaths based on WA state homicide mortality rate*
*^Observed number of deaths by homicide among KC homeless*
*+Statistically significant, p < .05*

**Table 6 Homeless deaths in proportion to the King County homeless population, 2009-2019**

| Year | KC PIT Count Estimate | Total KC Homeless Deaths | Crude Mortality Rate per 100,000 people |
|---|---|---|---|
| 2009 | 8,916 | 77 | 863.62 |
| 2010 | 8,937 | 56 | 626.61 |
| 2011 | 8,880 | 47 | 529.28 |
| 2012 | 8,830 | 82 | 928.65 |
| 2013 | 9,062 | 108 | 1191.79 |
| 2014 | 9,294 | 92 | 989.89 |
| 2015 | 10,047 | 130 | 1293.92 |
| 2016 | 10,688 | 141 | 1319.24 |
| 2017 | 11,643 | 174 | 1494.46 |
| 2018 | 12,112 | 196 | 1618.23 |
| 2019 | 11,199 | 168 | 1500.13 |

population are increasing annually (Sacramento County Department of Health Services, 2018; Los Angeles County Department of Public Health, 2019).

Deaths categorized as "natural" accounted for a third (35%) of cases in our study. Examining the case notes for these deaths reveals a more nuanced look at what "natural" deaths means for the unhoused population. Roughly 30% of natural deaths mentioned a history of chronic alcohol or substance use, at least two cases may have been related to complications from stab wounds, and in four cases, the decedent died in a hospital after being transferred from a jail.

Cardiovascular disease was also a common cause of natural deaths in the county during our study period. The American Heart Association reports that the vast majority of coronary heart disease deaths occur in those over age 64 (American Heart Association, 2013). In our study, the average age of death for those with cardiovascular disease was 49 years. Without proper access to health services like medication, chronic diseases are harder to control and lead to higher morbidity and mortality among the unhoused population. Additional risk factors for CVD include unhealthy diets, smoking, and excessive alcohol consumption, prevalent among unhoused populations (Ober, Carlson, & Anderson, 1997). Chronic stress and allostatic load also lead to the development of cardiovascular disease through psychological and physiological dysfunction (Logan & Barksdale, 2008). Psychological and environmental stressors rampant among people experiencing homelessness include the cumulation of life stress from victimization, material deprivation, and social isolation (Lippert & Lee, 2015).

The leading cause of injury deaths (excluding homicide and suicide deaths) were traffic-related and largely involved pedestrians or bicyclists being hit by vehicles. Mortality rates were 7 to 45 times higher among the King County homeless population1. Our findings are in line with a previous study that found significantly higher rates of pedestrian fatalities among unhoused people in Clark County, Nevada (Hickox, et al., 2014). High rates may be attributable to the placement of shelters and encampments near busy roads and highways, the reality of spending significant time outdoors, and impaired cognition due to mental health distress or substance use.

Mortality rates for train deaths, both accidental and intentional, were significantly higher among the King County homeless population. Standardized Mortality Ratios ranged from 0 to 138, although the statistics may be unreliable due to small numbers. We found no academic studies on train deaths among people experiencing homelessness, however recent news articles have linked increasing fatalities to the proximity of homeless encampments to train tracks (Dinkelspiel, 2019; Scheier, 2020).

Hypothermia was attributed to 20% of injury deaths. Wet or inadequate clothing and exposure to cold temperatures, wind, and rain contribute to hypothermia, and are conditions that unhoused people are unduly susceptible to (National Coalition for the Homeless, 2010). Additional risk factors for hypothermia include chronic or pre-existing conditions such as diabetes, infections, and malnutrition. Alcohol and substance use can inhibit shivering – a natural reflex that boosts protection from the cold – and may impair judgment and prevent the ability to seek health care services (Biem, Koehncke, Classen, & Dosman, 2013). These are all conditions and risk factors that unhoused individuals disproportionately experience.

An additional 13% of injury deaths were ascribed to falls. Five of these falls were from overpasses, illuminating the danger that unhoused people are exposed to on a daily basis. In another five the decedent was described as intoxicated at the time. As least two were possible suicides and another two were possible assaults. Several of the deaths were unwitnessed, thus

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1 The WA state comparison data combines all deaths labeled "pedestrian," "cyclist," "other pedestrian," "other pedal cyclist."

Guyot 2019). These types of deaths may be referred to as "deaths of despair," which describes [*handwritten: SDOH*] deaths related to increasingly desperate conditions among the working class and other poor communities (Case & Deaton, 2020). This framing helps us understand why those experiencing homelessness die at such high rates from suicide, overdose, and chronic substance use.

Our population of homeless decedents included considerably fewer homeless women (18%) than men (82%). But mean age at death among homeless women was 44.8 (sd = 14), that is, 5.1 years lower than homeless men (mean=49.9, sd= 12.7) (t-test, p-value <0.001). This is atypical for most populations, where women live longer than men. [*handwritten: Women vs. men.*]

Washington state has one of the longest life expectancies in the United States, at 80.3 years (US Burden of Disease Collaborators, 2018). The homeless population in Washington state's largest and wealthiest county, by contrast, reports an average age at death of merely 48.9 years. Although we cannot directly compare these two data points, the gap between these related measures is significant, with the age of death among the homeless well below the Washington state average life expectancy. [*handwritten: Has worsend since 2017. — see RLO's article*]

Data from King County Point in Time counts suggest the unhoused population in King County has increased by more than 25% between 2009 and 2019. This compares to an overall King County population increase of 16% and an overall Washington state population growth of 11% over the same period. Rents have risen in response to economic growth in the region and rapid influx of high-wage workers. McKinsey & Company report that from 2010-2017, the Seattle market rent rose 52% while housing supply only rose 8% (Maritz & Wagle, 2020). Simply, demand for affordable housing has outpaced the supply; affordable units have even been torn down to make room for expensive housing.

Our findings support previous research reporting unhoused individuals die at disproportionately higher rates and at significantly younger ages compared to housed populations. Violent and injurious deaths from preventable causes were particularly disproportionate.

# Limitations

As noted in other homeless mortality studies, the unreliable nature of homeless population estimates, and resulting miscategorization, makes it difficult to calculate mortality rates. In particular, demographic details of deceased homeless individuals in our database may not align with how those individuals identified in life. For example, our database includes only binary gender data, which we recognize leaves out nonbinary and transgender individuals, who are likely to be at especially high risk while experiencing homelessness. Further, data on racial and ethnic data on homeless decedents is extremely limited.

Medical Examiners, coroners, or funeral homes often rely on next-of-kin to help determine demographic information on death certificates. For decedents who were homeless at the time of death, next-of-kin may be difficult or impossible to reach. When death investigators resort to guessing racial and ethnic data for decedents, it leads to high possibility for misclassification. This is particularly true for AIAN peoples, who are not only already at high risk for homelessness due to the ongoing effects of colonialism and land dispossession, but also are significantly underrepresented and misclassified in public health data (Jim, et al., 2014; Arias, Heron, & Hakes, 2016).

Distinguishing between natural deaths related to chronic substance use, deaths due to acute intoxication / overdoses, and injuries sustained while under the influence is also difficult.

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initiatives Women in Black and the Homeless Remembrance Project) for guiding this work and their ongoing commitment to honoring the lives of unsheltered people in King County.

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# Health Status and Chronic Disease Burden of the Homeless Population: An Analysis of Two Decades of Multi-Institutional Electronic Medical Records

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## Abstract

Using a multi-institutional EMR registry we extracted housing status and evaluated the presence of several important comorbidities in order to describe the demographics and comorbidity burden of persons experiencing homelessness in northeast Ohio and compare this to non-homeless individuals of varying socioeconomic position. Of 1,974,766 patients in the EMR registry, we identified 15,920 (0.8%) as homeless, 351,279 (17.8%) as non-homeless and in the top quintile of area deprivation index (ADI), and 1,607,567 (81.4%) as non-homeless and in the lower four quintiles of area deprivation. The comorbidity burden was highest in the homeless population with depression (48.1%), anxiety (45.8%), hypertension (44.2%), cardiovascular disease (18.4%), and hepatitis (18.1%) among the most prevalent conditions. We conclude that it is possible to identify homeless individuals and document their comorbidity burden using a multi-institutional EMR registry, in order to guide future interventions to address the health of the homeless at the health-system and community level.

## Introduction

In recent years there has been growing recognition of the need for healthcare and healthcare systems to better understand and measure social and economic factors in an effort to adapt practices and care for patients.[1,2] These factors, commonly described as social determinants of health, refer to aspects of the environments "in which people are born, live, learn, work, play, worship, and age" and have been linked to a number of health outcomes.[3–6] These factors, and their upstream causes, may account for more of the variation in health and health outcomes than traditionally-examined aspects of the healthcare system.[7–10] Housing is among the most fundamental social determinants of health, and persons who are homelessness are among the most socially and medically vulnerable populations.

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Patients in the NEOCARE registry are broadly demographically representative across all levels of neighborhood socioeconomic status, when compared to data from the American Community Survey, with only slight differences observed in the oldest population (those over age 80) (Table 1). The registry contains recorded clinical information such as diagnoses, procedures, residential location history, laboratory results, and medications.

### Exposure

We identified persons ever experiencing homelessness using the address recorded at any visit to a Cleveland Clinic or MetroHealth facility. Individuals with no address ever listed (n = 562,626), with addresses outside of Ohio or whose census tract contained zero households (n = 481,039) were excluded. We identified addresses that contained the term "homeless" or common misspellings (e.g., homesless, hiomeless, homless, homelss, etc.). Next, we matched addresses to a known list of homeless shelters in the Cleveland region either by identifying the shelter name (e.g. 'Salvation Army', 'Shelter', etc.) or by matching the address with a list of known shelter addresses provided by the CWRU Center on Urban Poverty and Community Development which was obtained directly from their historical roster of regional homeless service agencies. Finally, we manually reviewed commonly occurring addresses to establish if they represented the location of current or former homeless shelters not captured in the preceding steps. Individuals who had no documented history of homelessness were divided into those living in areas in the top quintile of neighborhood socioeconomic deprivation and all others, as described below.

### Outcomes

We first describe the demographics of the population including patient age as listed at the first recorded homeless encounter or at the first encounter for the never homeless population, and further describe the burden of conditions present. Specific conditions include the 31 Elixhauser comorbidities[23] plus cardiovascular disease, tuberculosis, hepatitis, kidney disease, hypotension, anxiety, dissociative and somatoform disorders, and other neoplasms. Diagnoses were identified from all available information in the medical record including the problem list, history, and inpatient or outpatient encounter diagnoses using Clinical Classification Software (CCS) codes, ICD-9-CM and ICD-10-CM codes. Further, we used a count of the total number of unique conditions as a measure of multimorbidity.

### Statistical Methods

We calculated summary counts, percentages, means, and medians to describe the demographics (age, sex, race, ethnicity) and number of comorbidities of the groups. To operationalize neighborhood socioeconomic deprivation, we used a modified version of the Area Deprivation Index (ADI).[24,25] The ADI is an index which describes an area's socioeconomic disadvantage, with higher values representing more disadvantage.[25] We used the R sociome package[24] to calculate the ADI for all census tracts in Ohio using factor weights based on the Ohio population. Thus, our locally weighted ADI reflects the population of Ohio rather than that of the entire US. Data to calculate the ADI were derived from the 2010 census and the 2010–2015 five-year American Community Survey. Other work using ADI values from our region found that the ADI was stable over time and reported a 2009 to 2017 temporal association of 0.94.[26] We used the ADI to establish

homelessness.[15,16,32–37] Our paper demonstrates the utility of a multi-institutional electronic medical record (EMR) registry to examine the health status and demographics of the ever homeless population.

The demographic results of this study are fairly consistent with other estimates of the homeless population, with some dissimilarities likely due to population differences.[11] Of note, we observed differences in the racial composition of the groups, with 55.6% of the homeless population reporting Black/African-American which was similar to the 49.6% of the high area deprivation, however both of these are substantially higher than the 7.8% in the reference group. These results reflect both a highly racially segregated region as well as a high burden of homelessness among African Americans. When compared to a point-in-time count in 2018, our population has a higher proportion of Black/African-American (55.6% vs. 44.9%).[38] The region in which this study was conducted is, historically, an area of extensive redlining – the systematic practice of rejecting mortgage applications for predominately Black neighborhoods – and other lending practices which have created stark, persistent, and enduring inequities in housing, homeownership, and the accumulation of wealth over time.[39] Indeed, evidence suggests that, even today, lending practices differ between neighborhoods with majority Black residents as compared to those with majority White residents.[40]

Studying the pattern of morbidity among the homeless population is valuable to local and national public health and policymaking leaders who need to identify areas for intervention and modifiable risk factors to reduce the disease burden and increase the well-being of this population. Overall, the disease burden among the ever homeless was substantially greater than those who were never homeless. This disease burden is reflected in the higher prevalence of multimorbidity (measured through the median and mean total number of conditions) in the homeless and high area deprivation groups compared to the reference group of never homeless and non-high area deprivation. Notably, mental health conditions were common, with nearly half of the homeless experiencing depression, and/or anxiety disorders. Further, drug and alcohol abuse were much more common in the homeless population (41.1% and 30.6% respectively). This pattern of disease prevalence across the 3 populations was also seen for chronic pulmonary disease (36.8% in the homeless; 27.5% in the high area deprivation; 20.3% in the reference). Many of the conditions identified to be disproportionately prevalent in the homeless population are amenable to clinical intervention, and improved management of these conditions would likely return considerable value to the health care system.[41–43]

Some conditions, including hypertension, did not follow the generally observed pattern of higher prevalence among the ever homeless. Instead, the prevalence of hypertension in the three groups was relatively similar. While unadjusted for age, sex or racial differences, this result suggests that hypertension may be related to a milieu of individual and structural level systems as opposed to housing alone.[44] It seems likely that the array of disease-promoting factors contributing to both risk for homelessness and area deprivation are similar. Above all, the similarity of some conditions across the entire population suggests that there is considerable nuance and complexity in the relationship between housing and health.

Presently, there are broad efforts to incorporate collection of social determinants of health (SDOH) data into routine clinical encounters, making this data more available in the electronic medical record (EMR).[49–52] In addition to describing the comorbidity burden, our study also highlights that while identifying homeless or housing-insecure individuals via the address recorded is feasible, it is not necessarily a sustainable practice. For more rapid and real-time research and intervention based on these factors it is likely inefficient to rely on fragments contained in address fields, when it is possible to record this data more efficiently. A greater emphasis on structured and standardized fields – as well as buy-in from providers on regularly using these fields – would be critical to assess the health needs of homeless and housing-insecure individuals. This would permit more rapid data querying and referral to social services. In addition to a specific field to document homelessness, the growing focus on ICD-10-CM diagnosis codes for health-related social needs provides another opportunity to collect this type of information in a structured way.[53–56] However, in the interim our approach fills critical gaps in the literature and provides a strong foundation for focusing intervention efforts. Additional work to combine EMR data with Homeless Management Information System data will be necessary to confirm and extend our findings.

## Acknowledgements

## Abbreviations

| | |
|---|---|
| **EMR** | Electronic Medical Record |
| **ADI** | Area Deprivation Index |

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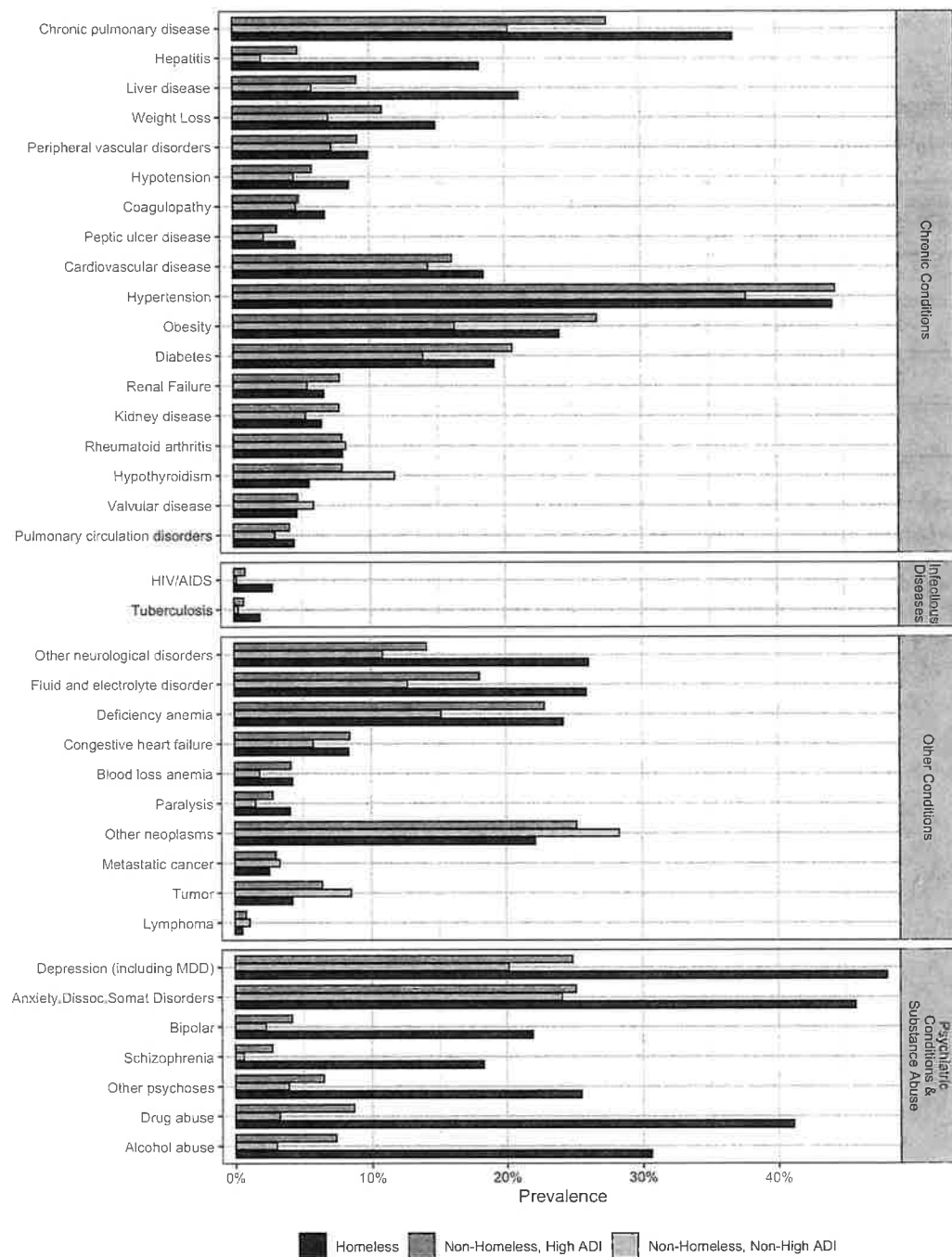
**Figure 1. Comorbidity prevalence by housing status.**
High area deprivation is defined as the top quintile of the Area Deprivation Index (ADI).
The conditions are grouped by broad disease category. MDD = Major Depressive Disorder;
Anxiety,Dissoc,Somat Disorders = Anxiety, Dissociative, and Somatoform Disorders; HIV/
AIDS = Human immunodeficiency virus/Acquired immunodeficiency syndrome

**Table 2.**

Demographic summary of the homeless, non-homeless with high area deprivation, and non-homeless with non-high area deprivation. High area deprivation is defined as the top quintile of the Area Deprivation Index (ADI).

| Demographic Summary % | Homeless n = 15,920 | Non-Homeless + High Area Deprivation n = 351,279 | Non-Homeless + Non-High Area Deprivation n = 1,607,567 |
|---|---|---|---|
| Sex | | | |
| - Female | 34.0 | 58.7 | 56.5 |
| - Male | 66.0 | 41.3 | 43.5 |
| Race | | | |
| - White | 38.0 | 38.4 | 85.3 |
| - Black / African American | 55.6 | 49.6 | 7.8 |
| - Other/Declined/Unavailable/NA | 6.4 | 12.0 | 6.9 |
| Ethnicity | | | |
| - Not Hispanic or Latino | 84.2 | 77.2 | 86.4 |
| - Hispanic or Latino | 5.0 | 9.7 | 1.6 |
| - NA | 10.8 | 13.1 | 11.9 |
| Age, years (%) | | | |
| - 18 – 24 | 14.2 | 27.6 | 18.1 |
| - 25 – 34 | 20.5 | 18.9 | 16.1 |
| - 35 – 44 | 25.7 | 18.2 | 17.4 |
| - 45 – 54 | 25.9 | 15.1 | 18.3 |
| - 55–64 | 11.1 | 10.2 | 14.5 |
| - 65+ | 2.6 | 10.0 | 15.7 |
| - Mean (±SD) | 40.7 (± 13.1) | 39.3 (± 17.6) | 44.8 (± 18.3) |
| - Median (IQR) | 41.1 (30.6 – 50.2) | 36.9 (23.7 – 51.4) | 44.1 (29.4 – 58.2) |
| Number of Conditions (Elixhauser only) | | | |
| - Mean (±SD) | 4.8 (± 3.6) | 3.3 (± 3.3) | 2.6 (± 2.8) |
| - Median (IQR) | 4 (2 – 7) | 2 (1 – 5) | 2 (0 – 4) |

NA = Not available

| Condition<br>% (95% CI) | Homeless<br>n = 15,920 | High Area Deprivation<br>n = 351,279 | Non-Homeless + Non-High Area Deprivation<br>n = 1,607,567 |
|---|---|---|---|
| Solid tumor without metastasis | 4.2 (3.9, 4.5) | 6.4 (6.3, 6.5) | 8.5 (8.5, 8.6) |
| Paralysis | 4.1 (3.8, 4.4) | 2.8 (2.8, 2.9) | 1.5 (1.5, 1.6) |
| HIV/AIDS | 2.8 (2.6, 3.1) | 0.8 (0.8, 0.8) | 0.2 (0.2, 0.2) |
| Metastatic cancer | 2.5 (2.3, 2.8) | 3.0 (3.0, 3.1) | 3.3 (3.3, 3.3) |
| Tuberculosis * | 1.9 (1.7, 2.1) | 0.7 (0.7, 0.7) | 0.3 (0.3, 0.3) |
| Lymphoma | 0.5 (0.4, 0.7) | 0.8 (0.8, 0.9) | 1.1 (1.1, 1.1) |

CVD = Cardiovascular disease; HIV/AIDS = Human immunodeficiency virus/Acquired immunodeficiency syndrome

*
Not an Elixhauser comorbidity and thus individuals may be counted in multiple comorbidity categories.

# Mortality among the homeless: Causes and meteorological relationships

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## Abstract

### Background

The homeless constitute a subpopulation particularly exposed to atmospheric conditions, which, in the temperate climate zone, can result in both cold and heat stress leading to the increased mortality hazard. Environmental conditions have become a significant independent risk factor for mortality from specific causes, including circulatory or respiratory diseases. It is known that this group is particularly prone to some addictions, has a shorter life span, its members often die of different causes than those of the general population and may be especially vulnerable to the influence of weather conditions.

### Materials and methods

The retrospective analysis is based on data concerning 615 homeless people, out of which 176 died in the analyzed period (2010–2016). Data for the study was collected in the city of Olsztyn, located in north-east Poland, temperate climatic zone of transitional type. To characterize weather conditions, meteorological data including daily minimum and maximum temperatures and the Universal Thermal Climate Index (UTCI) were used.

### Results

The average life span of a homeless person was shorter by about 17.5 years than that recorded for the general population. The average age at death of a homeless male was 56.27 years old (SD 10.38), and 52.00 years old (SD 9.85) of a homeless female. The most frequent causes of death were circulatory system diseases (33.80%). A large number of deaths were attributable to smoking (47.18%), whereas a small number was caused by infectious diseases, while a relatively large proportion of deaths were due to tuberculosis (2.15%). Most deaths occurred in the conditions of cold stress (of different intensity). Deaths caused by hypothermia were thirteen-fold more frequently recorded among the homeless than for the general population. A relative risk of death for a homeless person even in moderate cold stress conditions is higher (RR = 1.84) than in thermoneutral conditions.

data obtained in the West. Pathology that appears in older age groups should have a statistically weaker impact on the average age at death.

Many studies emphasize a correlation between mortality in the general population and meteorological parameters. In a meta-analysis of data encompassing 12 countries, Bunker A et al. indicate that both the increase and decrease of temperature by 1˚C may result in the elevated mortality rates of elderly patients owing to cardiovascular reasons [13]. In a large study of 6 513 330 deaths in 50 American cities, Medina-Ramón M et al. reveal a statistically significant correlation between mortality and extreme cold and extreme heat factors [14]. Based on data for the period 2006–2011 (China), Huang Z et al. arrive at a similar conclusion [15]. It appears that changeable temperatures in the surrounding environment may have an impact on mortality rates in the general population irrespective of the place of study. It may be hypothesized that in countries located in a cold climate, cold is the major risk factor for elevated mortality rates, whereas in subtropical countries it is heat. This hypothesis is, however, incorrect. When analyzing 74 225 200 deaths over a period of 27 years in 384 locations, Gasparrini A et al. observed that cold is a stronger risk factor for death [16]. In a similar analysis involving data from subtropical locations (6 214 deaths), Dang TN et al. note that although high temperature is a risk factor for death in short lags, it is cold that is a much stronger predictor of deaths in long lags [17]. Although the relationship between various health problems and mortality during unfavorable meteorological conditions is quite well-known and reported, the apparently obvious correlation with socio-economic conditions raises more doubts. In northern Europe the first wave of cold weather is normally associated with articles in the daily press devoted to the difficult situation of the homeless. Yet, data based on scientific findings are not so unequivocal. Although Hales S. et al. note higher mortality rates in wintertime among a low income population in New Zealand, neither Wilkinson P et al. (data from the UK) nor Rau R. (data from Denmark) confirm such a correlation [18–20]. Narrowing this literature overview down to the homeless significantly limits the number of available publications. Based on data from Paris, Rouquette A et al. revealed that 61.7% of people cared for at emergency departments in wintertime were homeless [21]. According to a study conducted by Ohsaka T in Osaka (Japan), hypothermia was the cause of death among the homeless in 4.08% cases [22]. Based on a study conducted in Ontario (Canada), Chen H. et al. suggest that the homeless are particularly vulnerable to meteorological conditions, but on the basis of the obtained data this suggestion cannot be confirmed [23]. Taking all the aforementioned studies and findings into consideration, we decided to verify whether the homeless are especially at risk of increased mortality and whether their mortality levels change depending on local meteorological conditions.

## Materials and methods

### Study population

The retrospective analysis was based on data collected by the Shelter for the Homeless in Olsztyn (Poland) recording people who stayed overnight in the shelter in the period 2010–2016. Olsztyn is inhabited by about 175 000 residents, including approximately 150–200 homeless people. The number of homeless individuals is generally stable, determined annually by the point in time method and monitored by the Regional Centre for Social Policy (The Marshall Office). The database of people who stayed overnight (at least once) in the shelter during the studied period included records for 1463 individuals. From this number, we managed to follow up on 615 cases (individuals who could be identified on the basis of the Personal Identification Number PESEL–absolute identifier—the national identification number used in Poland, mandatory for all permanent residents of Poland and for temporary residents living in

Based on UTCI values, we calculated the relative risk to quantify the magnitude of the cold and heat stress as factors influencing mortality among the homeless (outcome). The relative risk understood as a ratio of risk outcome with factor present (cold or heat stress) to risk outcome with factor absent (thermoneutral conditions, no thermal stress considered as a control group) was considered [29]. A RR number between 0 and 1 implies that risk of mortality among the homeless is lower, while RR >1 implies that the mortality risk is grater when the cold or heat stress is present. For the relative risk observed to be considered statistically significant, the 95% confidence interval (CI) was calculated.

To assess homeless deaths caused by the diseases assigned to groups A and B in relation to monthly UTC Index we performed a Two-way Cluster Analysis (TWCA) [30]. Cluster analysis is a statistical technique designed to classify samples into groups based on the degree of similarity among them with respect to a defined set of variables. The clusters were computed with the use of a Euclidean distance measure and Ward's linkage method. TWCA was applied to the data set using PC-ORD 6.0 software (PC-Ord 6.0, Gleneden Beach, Oregon). Power transformation of data was necessary to avoid negative values of meteorological variables. Due to standardization of the data, each parameter contributed equally to the data set variance and carried equal weight in the analysis.

Statistical analyses were performed with STATISTICA 13.1 for Windows.

## Ethic statement

The study protocol was approved by the Bioethical Committee of the Warmia and Mazuria Regional Medical Chamber in Olsztyn (239/17/Bioet). The authors declare no conflicts of interest in relation to this article.

## Results

### Demographic section

In the analyzed group of 176 deceased homeless people, 163 (92.61%) were men. The basic demographic data, including gender, age at death and date of death, are presented in Table 1.

According to data obtained from the Central Statistical Office for the city of Olsztyn in the period 2010–2015, the average age at death for an adult person (over 18 years of age) was 73.45 years old, SD 14.77 (n = 8647); 69.83 years old, SD 14.91 (n = 4468), for men and 77.33 years old, SD 13.59 (n = 4179), for women, respectively. These values are higher (in each comparison p<0.001) than the ones observed in our study (Table 1). According to the same data (the Central Statistical Office) the average number of deaths per 1000 inhabitants is 9.86 annually. In our study we followed up on 615 people for 7 years and noted 176 deaths. This amounts to the level of mortality of 40.88 (calculated per 1000 per year), thus being four-fold higher than in the general population. The average age at death is 56.27 years old for a homeless male and 52.00 years old for a homeless female; the difference is not statistically significant (p = 0.08).

Out of 148 cases of death (period of 2010–2015), in which it was possible to obtain information on the cause of death, it proved impossible to determine the cause of death in 6 cases. The remaining 140 cases were analyzed quantitatively, identifying groups of causes according to the European Shortlist for Causes of Death [31], and dividing them into subgroups of interest to our study, such as: alcohol related deaths [32], smoking-attributable deaths [33], cold related deaths–consistent with ICD–10 codes X31 or T68 (exposure to excessive natural cold, hypothermia), deaths due to external causes and violent deaths [34]. These results are presented in Table 2.

What draws attention here is the relatively small number (n = 4) of deaths due to infectious diseases and at the same time the relatively large number (n = 3) of deaths due to tuberculosis.
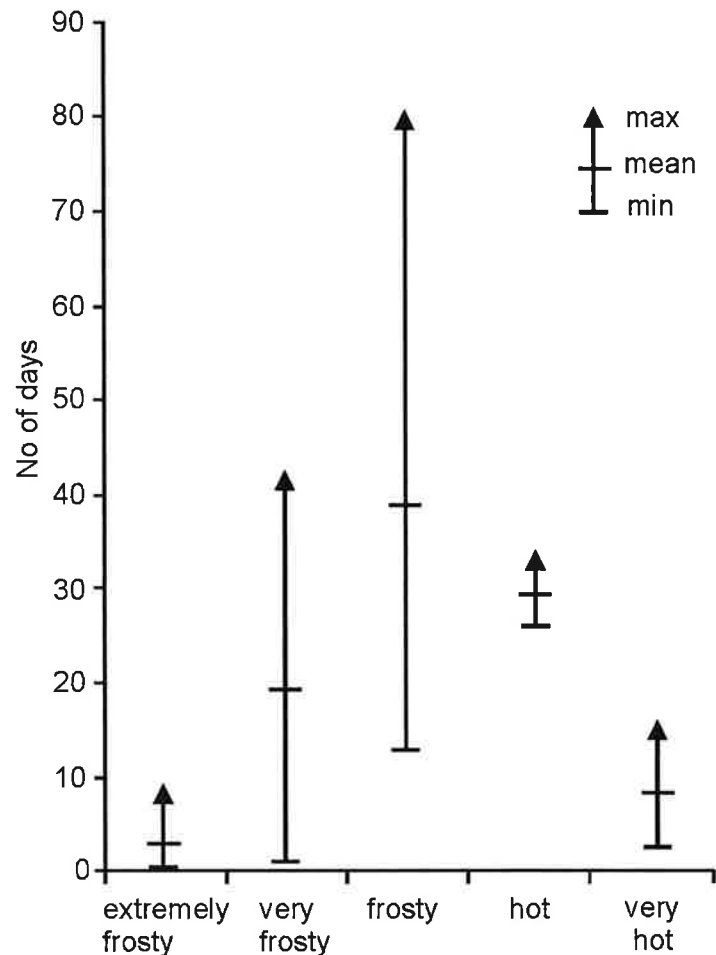
**Fig 1. Number of characteristic days in 2010–2016 by thermal categories.**

https://doi.org/10.1371/journal.pone.0189938.g001

## Weather conditions

In the analyzed period hot and very hot days occurred from April till September, with the largest number in July, their mean number amounting to 29 and 9 days, respectively. Frosty, very frosty and extremely frosty days, characteristic for the cold season, were most often noted in December, January and February. Their average number per year was 39, 20 and 4 days, respectively (Fig 1).

Biothermal conditions with no thermal stress amounted on average to 28% days per year. The largest numbers of such days (more than 50% per month) were observed from April till September, with the maximum in June when their number reached almost 73% (Table 3)

Almost 63% of days per year were classified as characterized by cold stress, whereas the most frequently noted category was moderate cold stress, on average occurring on 33% of days per year. Days classified as those of moderate and strong heat stress occurred from May till August and on average they amounted to 9% of days per year in total. No cases of unbearable cold/heat stress were noted.

The largest number of deaths, approximately 40% (n = 70), occurred during moderate cold stress, i.e., the most frequently observed thermal stress, whereas 22% (n = 38) happened in
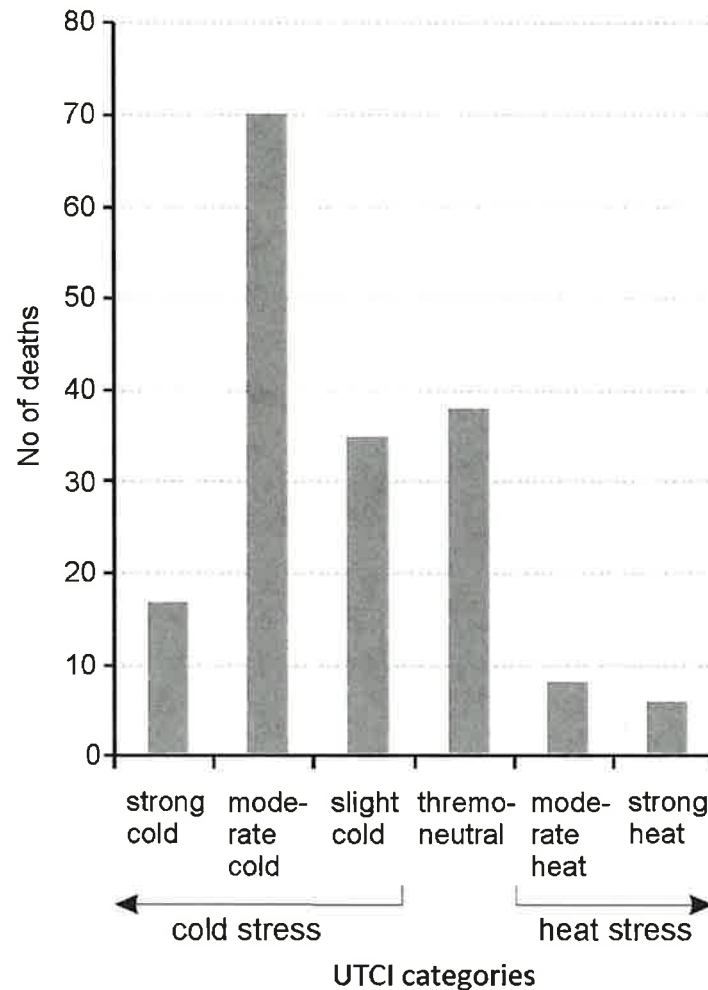
**Fig 2. Number of deaths in categories of thermal stress according to UTCI (n = 174).**

https://doi.org/10.1371/journal.pone.0189938.g002

the cold season; lowest temperatures ranged then from -17.0°C to +3.6°C, with UTCI values (from −12.2°C to −20.8°C) indicating thermal stress within the categories of moderate cold stress and strong cold stress, when actions to protect the body against hypothermia should be undertaken.

**Table 4. Relative risks (RR) of mortality among the homeless population due to cold and heat stress (exposed group) in comparison to thermo-neutral conditions (control group).** The RR and 95% confidence interval (CI) are calculated according to Altman 1991 [29].

| Homeless mortality cause | Relative risk | 95% CI | P-value |
|---|---|---|---|
| **Cold stress vs thermoneutral conditions** | 3.21 | 2.38 to 4.32 | **p < 0.001\*** |
| Strong cold stress vs thermoneutral conditions | 0.45 | 0.26 to 0.76 | **p = 0.003** |
| Moderate cold stress vs thermoneutral conditions | 1.84 | 1.32 to 2.57 | **p < 0.001** |
| Slight cold stress vs thermoneutral conditions | 0.92 | 0.61 to 1.38 | p = 0.693 |
| **Heat stress vs thermoneutral conditions** | 0.37 | 0.21 to 0.66 | **p < 0.001** |
| Moderate heat stress vs thermoneutral conditions | 0.22 | 0.10 to 0.45 | **p < 0.001** |
| Strong heat stress vs thermoneutral conditions | 0.17 | 0.07 to 0.38 | **p < 0.001** |

\*Significant p-values are marked in bold

https://doi.org/10.1371/journal.pone.0189938.t004

## Discussion

Literature sources referred to in the introductory section indicate that the average life span of a homeless person is shorter by 16–28 years than the values observed in the general population, and ranges from 48 to 51 years. In our study (Table 1) the average age at death of a homeless person was 55.95 years old and this value was smaller by 17.5 years than the one found in the general population. This difference is particularly evident in the group of females and amounts to 25 years (52.00 and 77.33, respectively), whereas the average age at death of a homeless female seems to be lower than in the case of males, inversely than in the general population. Considerable, although typical of this subpopulation, predominance of men makes this difference statistically insignificant p = 0.08 [35].

Excessive mortality among homeless females has been noted by other researchers, yet it has not been confirmed by all of them [36–41]. It seems that this problem refers to a younger age group in particular and, consequently, it is evident in the younger average age at death. Our empirical material does not warrant the analysis of the causes for this phenomenon. We believe, however, that further studies accounting for different courses and manners of becoming addicted as regards homeless females and males might explain this issue [42–44].

As specified by various reports, deaths among the homeless are primarily attributed to circulatory system diseases (23%), followed by drug overdose (21%) and accidents (14%) excluding poisoning [45]. Among young homeless people the most frequent causes of death include poisoning (opiates, alcohol), as well as accidents and suicides, whereas in the slightly older age group (25–44 years), the most frequent cause is AIDS that exceeds all aforementioned causes. As age increases, neoplasms and circulatory system diseases become more statistically significant [4]. In our study (Table 2) deaths were caused first by circulatory system diseases (33.80%), followed by traumas and poisoning (21.13%), and by respiratory system diseases (n = 16, 11.27%).

Circulatory system diseases are also the most frequent cause of death in the general population. Various sources report that 80–90% of the homeless are smokers, irrespective of whether the study was conducted in Europe, America, or Asia [46–48]. Smoking is evidently a risk factor for circulatory and respiratory systems diseases. According to the data collected in the same region as our study, 84.96% of the homeless are smokers with the average risk of 27.79 pack-years [8]. This seems to be confirmed by the data included in the first part of Table 2, presenting smoking-attributable deaths. Every second death recorded in our study may be associated with smoking. It should also be noted that the average age at death attributable to smoking is relatively advanced (exposure time). Similar to the study by Hwang SW et al., pleonasms and circulatory system diseases as the causes of death are more frequent in the elderly homeless [4]. A small number of deaths due to infectious diseases (n = 4), noted in the results section, can be attributed to local specificity. In this region, HIV infections in this subpopulation are not particularly frequent (2.36% of infected individuals), whereas a rather high (2–3%) incidence of tuberculosis is reflected in a relatively large number of deaths (n = 3; 2.11%) [49–51].

In their meta-analysis, Fazel et al. determined the percentages of individuals dependent on alcohol at 8.5–58.1%., pointing out one important fact that the percentages of alcohol-dependent individuals among the homeless are generally higher in Europe than in the United States [12]. Romaszko et al. estimated that 78.57% of Polish homeless were dependent on alcohol [8]. In our study, alcohol related deaths amount up to 19.72%. However, if we assume that deaths due to hypothermia among the homeless are very likely to be secondary to alcohol consumption, then this value will increase to 23.24%. In our view, irrespective of different qualifications of such deaths by various authors, in this subpopulation such estimation is justified.

difference is even more evident among women and amounts to 25.3 years. Although there is no statistically significant difference between the average age at death of a homeless woman and a homeless man, it appears that the tendency to equalize (if not inversion) as compared to the general population is observed here. As in the general population, the most frequent causes of death are related to circulatory system diseases. A large percentage of deaths attributable to smoking and alcohol consumption should be noted. The analysis of relationships between mortality among the homeless and meteorological factors indicates that in conditions characteristic for the temperate transitional climate of Central Europe, such parameters as tmax, tmin and UTCI have both an direct (cold) and indirect (smoking, alcohol) impact on mortality among the homeless. Deaths due to hypothermia were thirteen-fold more frequent among the homeless as compared to the general population. A relative risk of death for a homeless person exposed to cold stress (even moderate one) is much higher as compared to thermoneutral conditions. Our results showed that UTCI may serve as a useful tool to predict death risk in this group of people. It also indicates that weather-warning systems should be implemented to alert the public not only to the danger of extreme weather conditions but should be extended to moderate cold stress attributes and focused on susceptible subpopulations.

## Limitations

In our study a homeless person is defined as any person who ever remained overnight at the Shelter for the Homeless in Olsztyn during the years 2010–2016. Such a person at that time fulfilled the ETHOS classification criteria (category 3.1)[54]. It should be remembered, however, that some homeless people may have never appeared in the shelter (roofless homeless), may have lived and died anywhere within the city of Olsztyn. We are unable to identify such people. Another point that should be taken into consideration when analyzing our data is the fact that homelessness is not a constant parameter. A person who was homeless in 2010, may have died a few years later as a patient in a nursing home, and yet is recorded in our database. Moreover, although homeless people constitute the poorest social class, it is possible that in singular cases particular individuals may have changed their economic status in the analyzed period. We believe, however, that if such an error actually exists, it is minimal.

## Supporting information

**S1 Data. Aggregate dataset.**
(XLSX)

## Author Contributions

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# Homelessness & Inadequate Housing

Homelessness is often caused by a complex combination of interwoven social and health factors. Poor physical and mental health can both cause and result in homelessness. Illness or injury can lead to lost income, the loss of a job and health insurance leading to a downward spiral in health. Homelessness can result in illness due to exposure to the elements outdoors, communicable disease exposures, violence, and poor nutrition. Homelessness has been defined as existing when people lack 'a fixed, regular, and adequate nighttime residence'.[1] They may be in sheltered (e.g., emergency shelter or transitional housing) or unsheltered (e.g., outside or in vehicles) situations, and may e single adults, families, and youth.

Washington conducts an annual point in time count of sheltered and unsheltered people experiencing homelessness in each county. This count does not include people in supported housing. In 2017, there were an estimated 21,112 homeless people living in Washington for a rate of 289 per 100,000 people. Overall, the rate decreased from 2005 to 2013, and has been increasing since, largely due to increased rents, low vacancy rates and slow wage growth.

To address this increase, the state is working with stakeholders to improve general housing affordability by improving zoning and planning, permitting, development and financing, and construction processes.[2]

The state continues to improve the efficiency of the existing homeless crisis response system investments through implementation of additional performance benchmark and planning requirements.[3]

## 1 of 346
Washington residents is homeless

Over half of the people experiencing homelessness are in King County

# Geographic Variation

- In the 2017 Point in Time Count (PIT), one-half of the people experiencing homelessness in Washington were in King County (11,643 people). King County comprises about 30% of the state population.

- Counties with between 500 and 2,000 people experiencing homelessness included Clark, Kitsap, Pierce, Snohomish, Spokane, Thurston, Whatcom and Yakima counties.

- Clallam, Jefferson, King, and Whatcom counties had rates of homelessness that were greater than the state rate. In two counties, Jefferson and King, the homelessness rate was more than 500 per 100,000.

- There were multiple counties where the rate of homelessness was less than the state rate including Asotin, Benton-Franklin, Clark, Grant, Island, Kitsap, Kittitas, Klickitat, Lewis, Okanogan, Pacific, Pend Oreille, Pierce, Snohomish, Spokane, Stevens, Thurston, Whitman, and Yakima counties.

*(handwritten note: now over 2,000 in p.c.)*

## Homelessness Washington Counties, Point in Time Count, 2017



Rate per 100,000
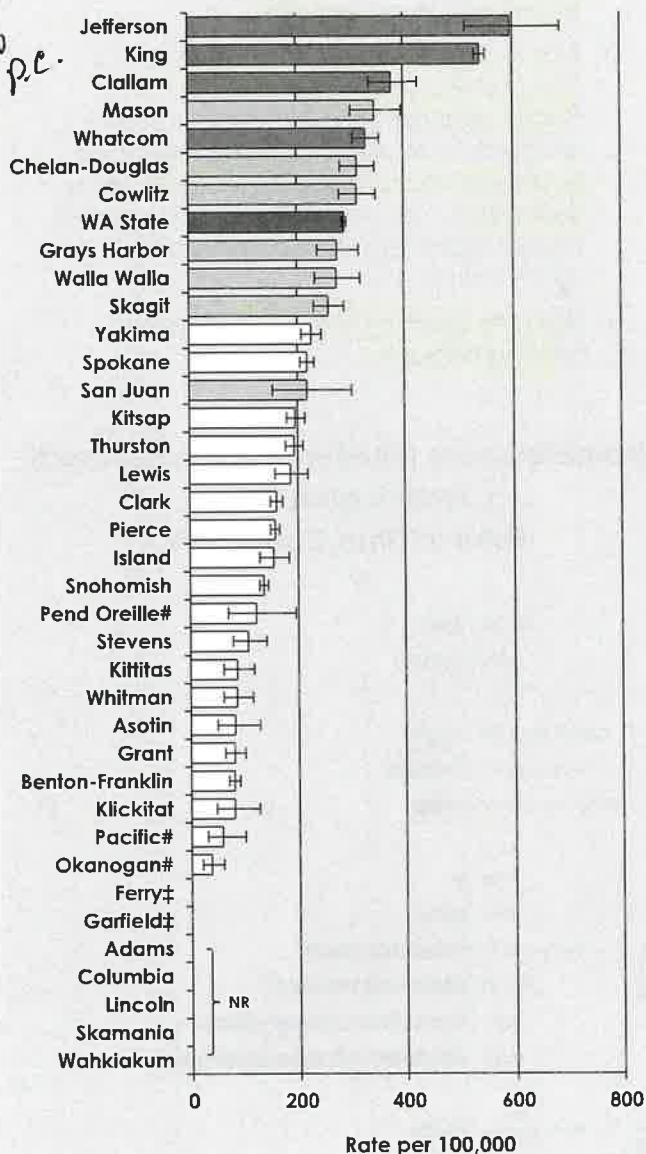
Legend:
- WA State
- Same as WA State
- Lower than WA State
- Higher than WA State

‡County had zero cases
NR: Not reported if RSE ≥ 30% or to protect privacy
#Relative standard error (RSE) is between 25% and 29%

# How is Washington addressing homelessness & inadequate housing?

- The recently updated Homeless Housing Strategic Plan[3] describes how the homeless crisis response system plans to continue improving the 1) identification, assessment, and prioritization of people facing homelessness; 2) effectiveness and efficiency of housing interventions; 3) and identification of the policy changes and resources necessary to house all people living unsheltered.

- The Washington State Department of Commerce issues grants to county governments and other designees through the Consolidate Homeless Grant (CHG). As part of the Strategic Plan, the department has added to and refined contract performance benchmarks and technical assistance to better guide the use of available housing resources toward those most in need using the most efficient interventions.

- The Washington State Department of Commerce has a special focus on homeless youth. The Office of Homeless Youth Prevention and Protection Programs (OHY) works statewide to reduce and prevent youth and young adults from experiencing homelessness. The five areas of focus include: stable housing, family reconciliation, permanent connections, education and employment, and social and emotional well-being.

- The Washington State Department of Commerce Weatherization Plus Health pilot program focused on reducing asthma triggers by controlling moisture, mold and dust. They also provided carbon monoxide detectors and downspout repair. These are the 'plus health' components of a weatherization program that already increases energy efficiency and warmth in the homes of low-income homeowners.

- As part of Results Washington Goal 4 (healthy and safe communities/supported people), Goal 3.1.c aims to decrease the number of homeless people from the anticipated increase to 25,221 in 2018 to 24,222 by 2020.

- As part of Washington State's Medicaid transformation, the Foundational Community Supports program recently launched. This program creates two new targeted benefits that include services that help the most vulnerable beneficiaries get and keep stable housing and employment, in support of their broader health needs.

- As part of the End AIDS in Washington State initiative, Goal 8 is to increase access to safe, stable, and affordable housing for people living with and at risk for HIV.

See also HIV

## Technical Notes

*Con dence Intervals:* Definition and examples are described in Appendix C

*Counts of Homelessness:* A description of different methods for counting homelessness and what they mean is described here.

*Homelessness Point in Time Count:* Methods for the annual Point in Time Count are described here.

*Race and Ethnicity:* Classification described in Appendix C

*Relative Standard Error:* Definition and how it was used is described in Appendix C

## Endnotes

[1]Homeless Emergency Assistance and Rapid Transition to Housing: Defining 'Homeless'. 24 CFR Parts 91, 582, and 583 (page 76013). www.hudex-change.info/resources/documents/HEARTH_HomelessDefinition_FinalRule.pdf. Published December 5, 2011. Accessed September 11, 2017.

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