

Building for Safety: Assessing Fire Codes in Multifamily Housing

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Housing Policy Initiative
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Pew

TOPICS: STRENGTHEN STATE GOVERNMENT

PROJECTS: HOUSING POLICY

Modern Multifamily Buildings Provide the Most Fire Protection

Rate of fire death in modern apartments is one-sixth the rate of single-family houses and older apartment buildings

TOPICS: STRENGTHEN STATE GOVERNMENT | BUILD COMMUNITIES

PROJECTS: HOUSING POLICY

Small Single-Stairway Apartment Buildings Have Strong Safety Record

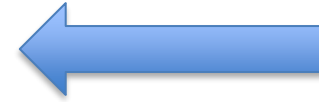
Revised building codes could encourage construction, boost supply of lower-cost homes

Context: Housing Costs are Near All-Time Highs



- Half of renters are spending more than 30% of their income on rent
- One-quarter of renters are spending more than 50% of their income on rent
- First time median rent has reached \$1,400 or median sale price has topped \$420,000
- Homelessness at an all-time high
- Household size is at an all time low (2.50) and 63% of U.S. is 1 or 2 person households
- U.S. housing shortage estimated at 4 to 7 million homes

Closing the Housing Shortage Takes Multiple Approaches and Products

- Apartment building of all sizes (large, medium, small)
- Condos
- Townhomes and row homes
- Accessory dwelling units
- Manufactured housing
- Adaptive reuse
- Co-living
- ...



Regulatory Barriers to New Apartments

- Restrictive zoning (especially disallowing apartments on most land near transit or commerce)
- Uncertain and cumbersome permitting (multi-year processes to get approvals)
- Restrictive building codes (elements that add ample cost but not safety) 
- Fire-safety concerns sometimes block new apartments, but not other new homes; and they do not affect older, existing homes that people live in 

Research Gaps: How Safe are Multifamily Buildings?

- Fires in apartment buildings have gotten less deadly since 1980 (Hall 2024 using NFPA data)
- Limited prior work on fire death rates by building type and age
- Lack of analysis on single-stairway fire safety in the U.S. context
- Data limitations

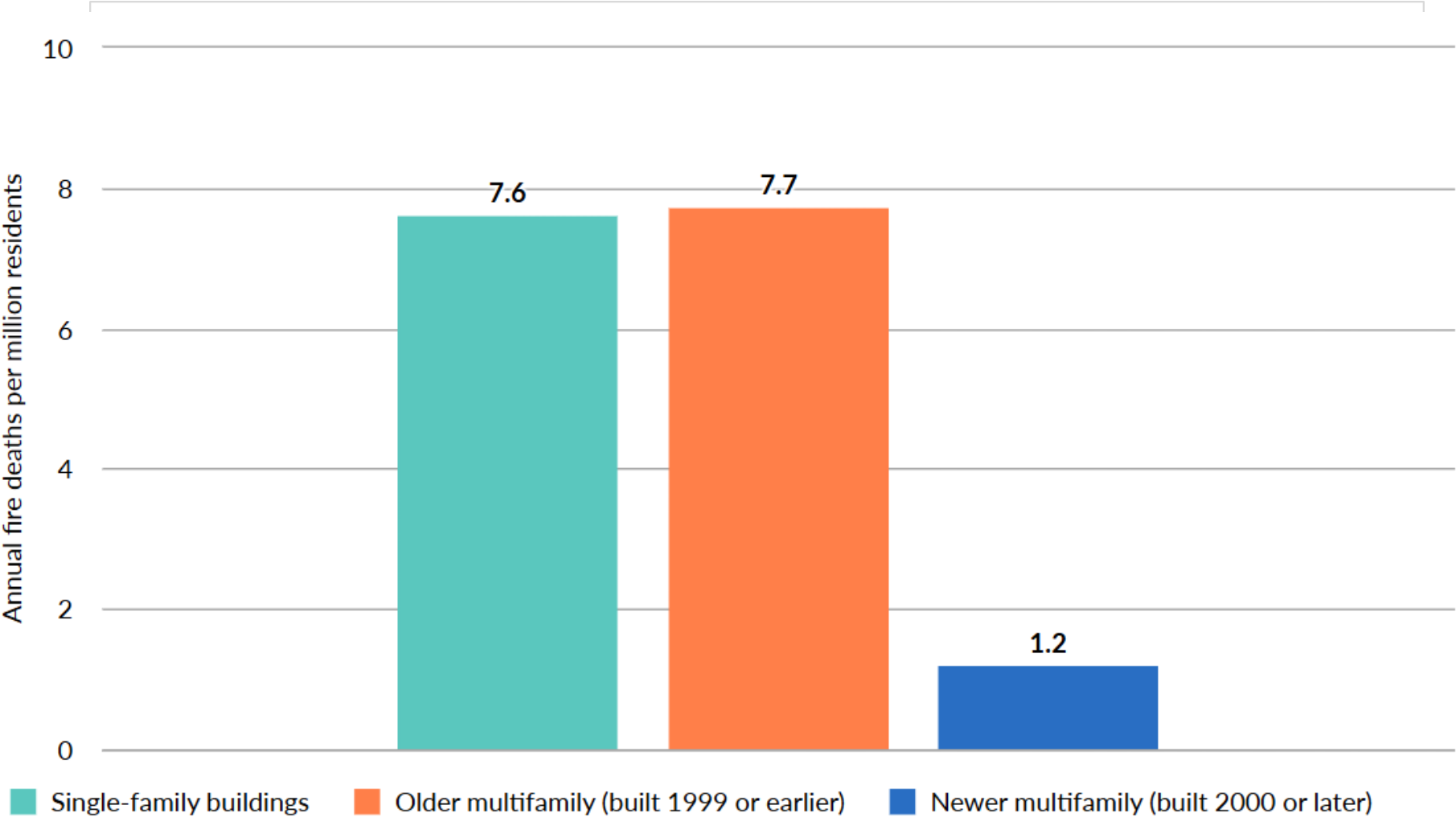
Understanding Fire Death Rates Requires Combining Multiple Datasets

- Fire deaths and incident information:
 - National Fire Incident Reporting System (NFIRS): <https://www.usfa.fema.gov/nfirs/access-data/>
 - U.S. Fire Administration Home Fire Fatalities in the News (USFA Media): <https://apps.usfa.fema.gov/civilian-fatalities/>
 - Archived news articles / clips
- Building age and type:
 - Property records / assessor data (ATTOM)
 - Online searches, real estate websites, and news articles
- Units by building type and age:
 - ACS by tenure by year built by units in structure
- Single-stair buildings:
 - In New York City, Primary Land Use Tax Lot Output (PLUTO) dataset

Analyzing Fire Deaths by Building Age & Type



- We merged the only two large, available fire-death datasets, NFIRS & USFA Media to create the most comprehensive dataset of U.S. fire deaths for 2023, the most recent year that had complete data from both.
- We coded every fire death by housing type (single-family or apartment and number of units) and year of construction.
- We calculated a fire-death rate per million residents based on these fire deaths and the total ACS population living in each housing type.
- We broke this out by state and added in additional years from small-population states to observe patterns of fire-safety by building type across states throughout the U.S.

New Apartments Have 1/6 Fire Death Rate of Other Housing



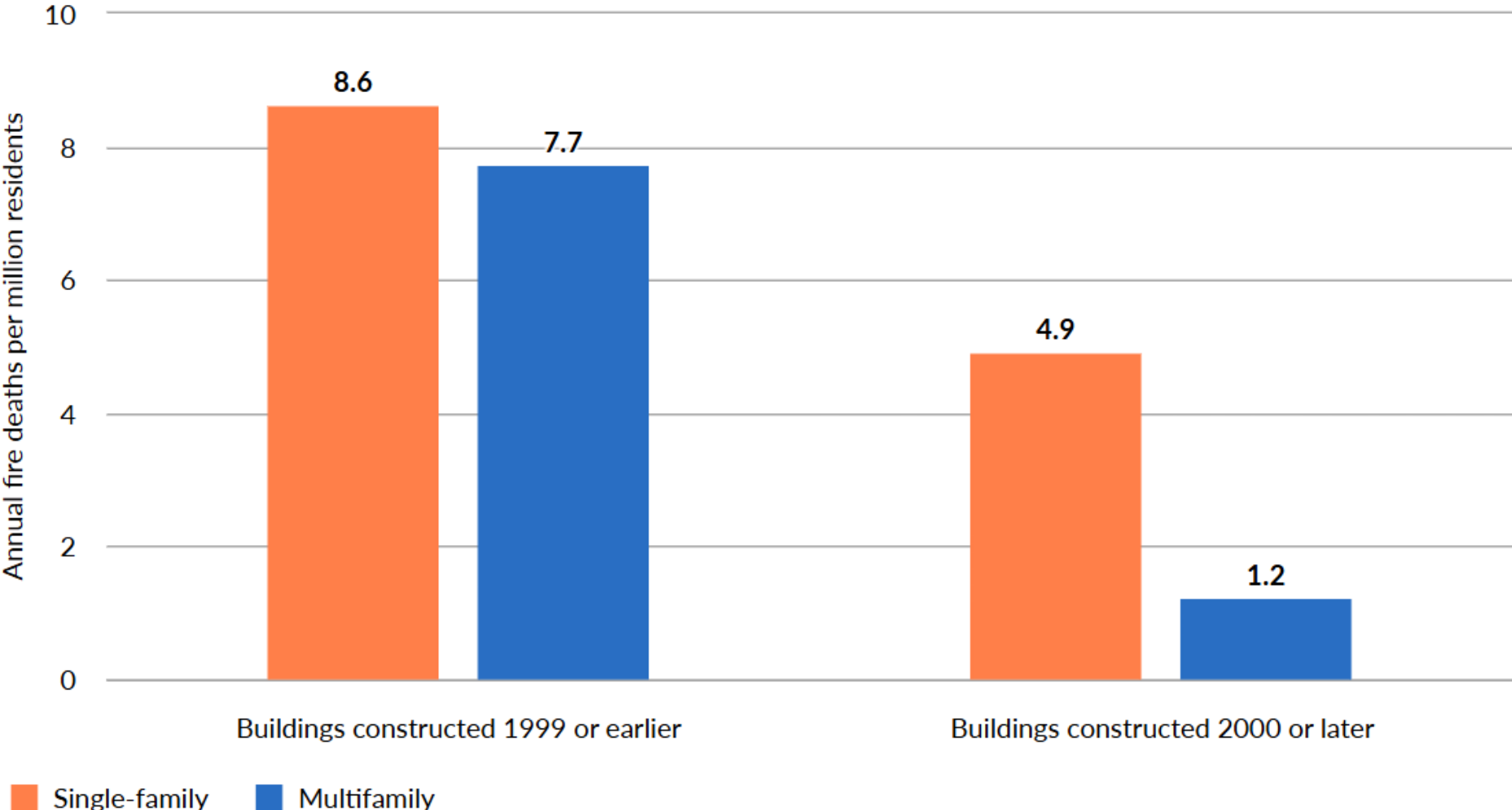
Source: Pew Analysis of NFPA and American Community Survey 2023 1-year Estimates

New Apartments are Much Safer Than Single-Family Houses or Older Apartments

	Single-family homes	Older multifamily (built before 2000)	Modern multifamily (built in 2000 or later)
Fatal fire incidents	1,641	308	20
Fire deaths	1,985	369	23
Share of fatal fires	83%	16%	1%
Share of fatal fire deaths	84%	16%	1% 
Share of housing stock	74%	19%	7%
Share of Americans living in each type of housing	80%	15%	6% 
Number of occupants	259.5 million	47.9 million	18.9 million
Annual fire death rate, per million occupants	7.6	7.7	1.2

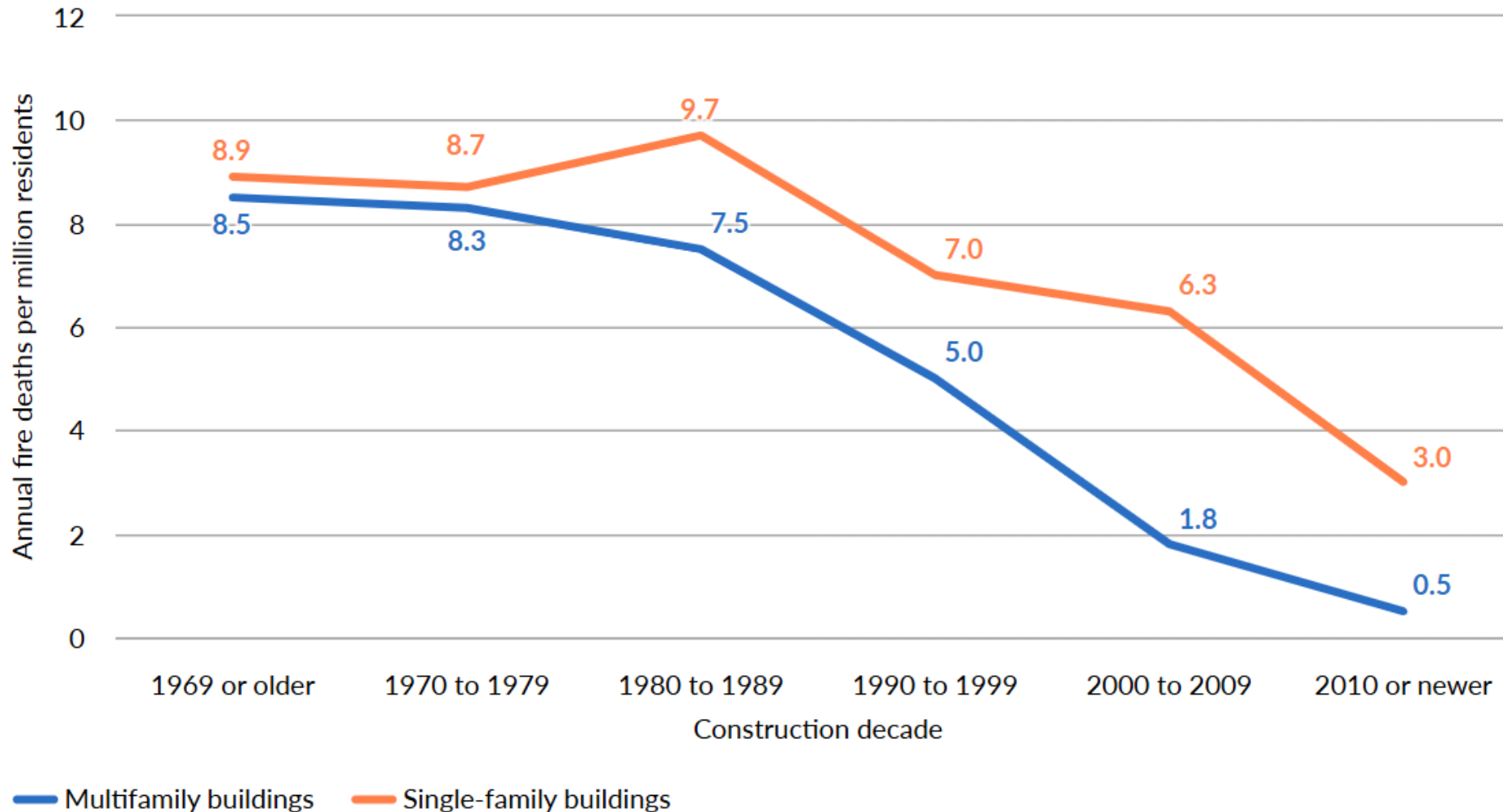
Source: Pew Analysis of NFPA and American Community Survey 2023 1-year Estimates

Across All Building Types and Ages, New Apartments Are Safest



Source: Pew Analysis of NFPA and American Community Survey 2023 1-year Estimates

New Homes Are Much Safer Than Old Ones—Especially Apartments



Source: Pew Analysis of NFPA and American Community Survey 2023 1-year Estimates

Newer Apartment Buildings are Safer Than Older Ones, Regardless of Size



Source: Pew Analysis of NFPA and American Community Survey 2023 1-year Estimates

Examples of Fire-Safety Measures in Modern Apartments

- Sprinklers
- Self-closing doors
- Connected smoke detectors
- Fire-rated walls
- Non-combustible stairways



***Modern Apartments Have the
Strongest Safety Record Across States***

Modern Apartments' Fire Safety Record is Strongest in all U.S. Regions

State	Fire death rate, single-family, per million residents	Fire death rate, older multifamily (1999 or earlier), per million residents	Fire death rate, newer multifamily (2000 or later), per million residents	Total fire deaths in 2023
AL	15.3	10.7	0.0	71
CA	2.6	3.3	0.5	100
FL	3.9	4.0	0.6	80
GA	10.3	4.5	3.1	101
IL	7.8	11.1	3.2	101
IN	9.1	17.2	4.2	65
KY	12.1	12.1	0.0	51
LA	14.5	10.0	5.3	61
MI	11.9	6.1	12.5	111
NC	9.3	9.1	0.0	91
NJ	7.3	8.2	1.7	65
NY	7.9	7.4	2.3	139
OH	9.7	14.8	2.6	116
OK	13.3	19.4	0.0	52
PA	10.0	11.3	0.0	124
SC	14.4	11.2	0.0	70
TN	15.2	24.0	2.7	107
TX	4.9	4.9	0.4	135
WA	7.6	10.0	0.0	56

Source: Pew Analysis of NFPA and American Community Survey 2023 1-year Estimates

Multiple Years of Data Show Same Pattern; New Apartments Are Safest

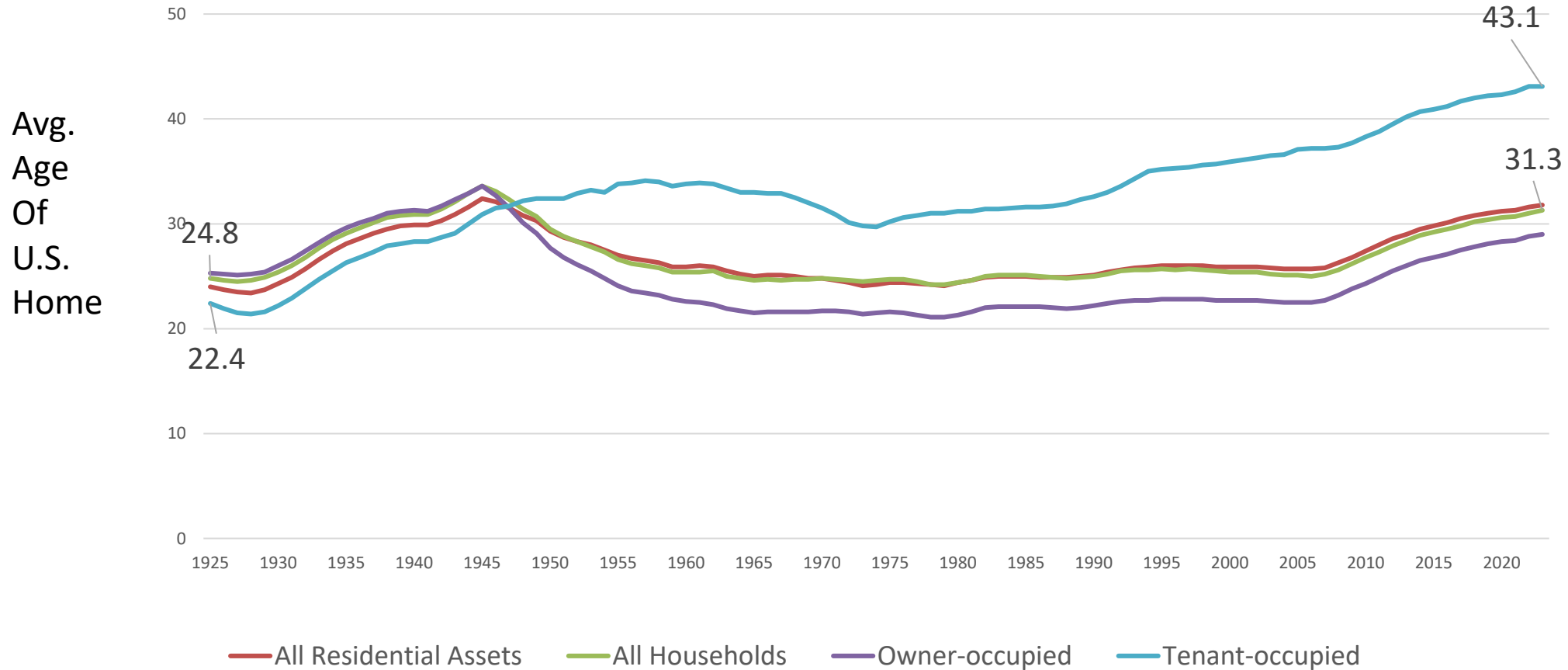
State	Annual fire death rate, single-family, per million residents	Annual fire death rate, older multifamily (1999 or earlier), per million residents	Annual fire death rate, new multifamily (2000 or later), per million residents	Total deaths from years collected
AZ	4.3	6.4	0.0	62
CO	2.7	2.5	1.1	59
DE	10.3	7.1	0.0	58
HI	3.0	4.1	0.0	51
MA	5.8	4.7	0.0	69
MD	7.3	4.8	1.5	80
ME	10.6	7.5	0.0	67
MT	8.0	6.2	0.0	58
NM	8.3	2.8	0.0	62
RI	6.5	3.2	0.0	50
UT	2.7	2.9	0.0	60
VA	5.0	3.2	0.0	77
WI	7.8	10.8	3.0	92
WY	9.3	4.0	4.6	60
Totals	783 deaths	115 deaths	6 deaths	905 deaths

Source: Pew Analysis of NFPA and American Community Survey 2023 1-year Estimates

***Implications: Removing
regulatory barriers to
apartments would improve
fire safety***

U.S. Housing Stock is Oldest it Has Ever Been

Older Housing Usually Lacks Modern Fire-Safety Measures



Source: U.S. Bureau of Economic Analysis
Note: Results are cost-weighted

Age of Apartments Strongly Correlates with Fire Death Rate

Construction year	Number of fatal fires	Number of fire deaths	Estimated total population	Multifamily fire death rate (per million occupants)
2010 or newer	4	4	8,295,727	0.5
2000 to 2009	16	19	10,608,950	1.8
1990 to 1999	33	41	8,260,634	5.0
1980 to 1989	51	58	7,733,619	7.5
1970 to 1979	66	81	9,744,315	8.3
1969 or older	158	189	22,205,959	8.5

Source: Pew Analysis of NFPA and American Community Survey 2023 1-year Estimates




***How to produce more
apartments?***

***The case of single stairway
mid-rise buildings***

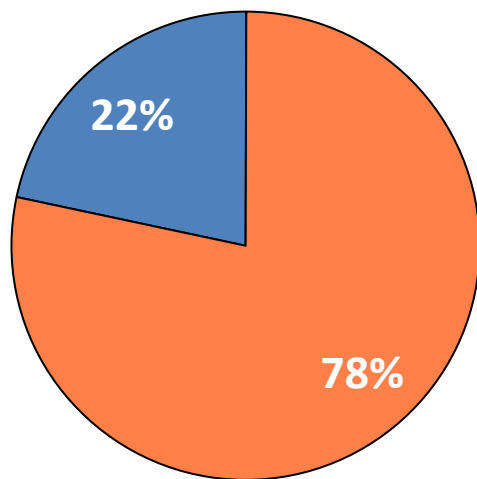
Policy Trends to Allow More Housing Types

Example states shown, others have enacted

- Enabling accessory dwelling units (ADUs) (Arkansas & Maryland 2025)
- Legalizing multifamily near commerce or transit (Texas 2025 & Colorado 2024)
- Streamlining permit approval processes (Georgia 2019 & Arizona 2025)
- Building code reforms (Tennessee 2024 & New Hampshire 2025) 
- Limiting parking mandates (Washington & Montana 2025)
- Enabling home sharing & co-living (Iowa 2017 & Oregon 2023/2025)
- Simplifying office-to-residential conversions (Texas & Connecticut 2025)

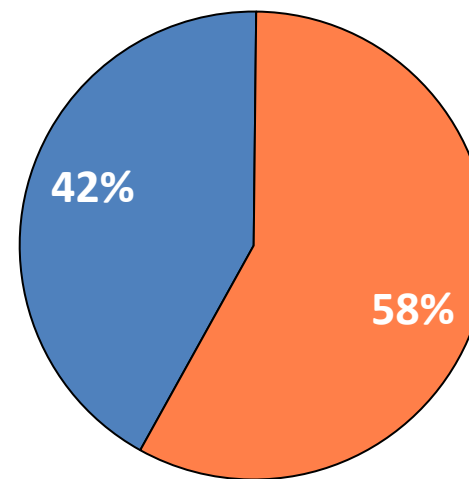
U.S. has shortage of small apartment buildings, which tend to be more affordable than other rental unit types

Small Apartments (2-19 Units) by Building Age



■ Built since 2000 ■ Built before 2000

Large Apartments (50+ Units) by Building Age



■ Built since 2000 ■ Built before 2000

Note: Small apartment buildings are about 40% of U.S. rental housing units

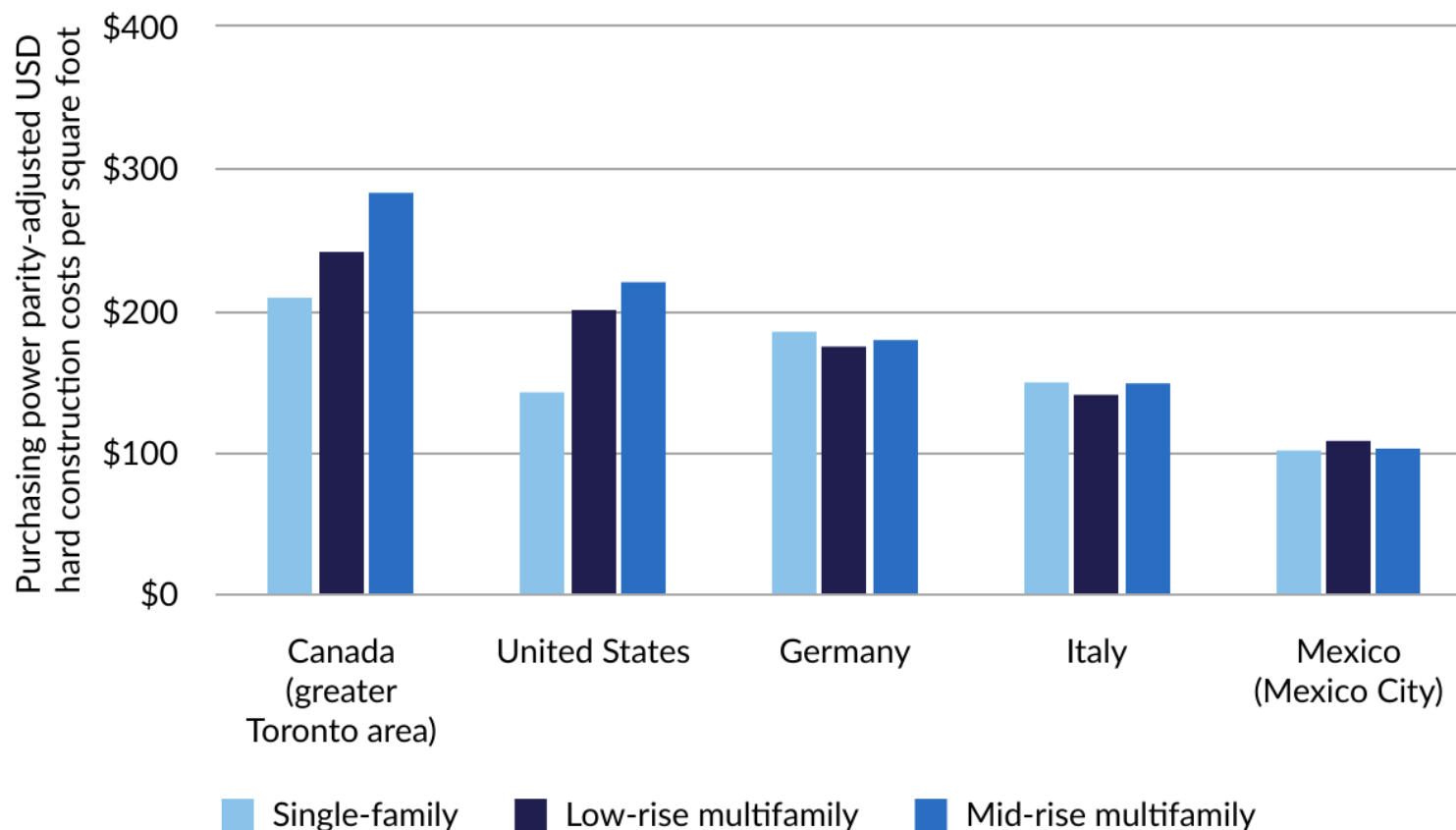
Source: ACS 2023

Figure 4

Construction Costs Increase With Density in the U.S. and Canada, but Not Internationally

Per-square-foot costs for multifamily units are higher than for single-family units in the U.S.

Why?



Source: U.S.: RSMMeans Construction Cost Data, 2024; Canada: 2024 Canadian Cost Guide; Germany: Bki Baukosten Gebäude Neubau 2024; Italy: Collegio degli Ingegneria Architetti di Milano, Prezzi Tipologie Edilizie 2024; Mexico: Raúl González Meléndez, Costos Paramétricos, 2024

Stairways are one such cost item: single-stair construction reduces cost, can enable viability

Savings from 1 staircase per building:
6-13% lower construction costs, accounting for additional fire protection



For a small 6-story apartment building, with 4 units per story, and 2,000 square feet per floor:

Base construction cost: \$250 / square foot (southeast U.S.)

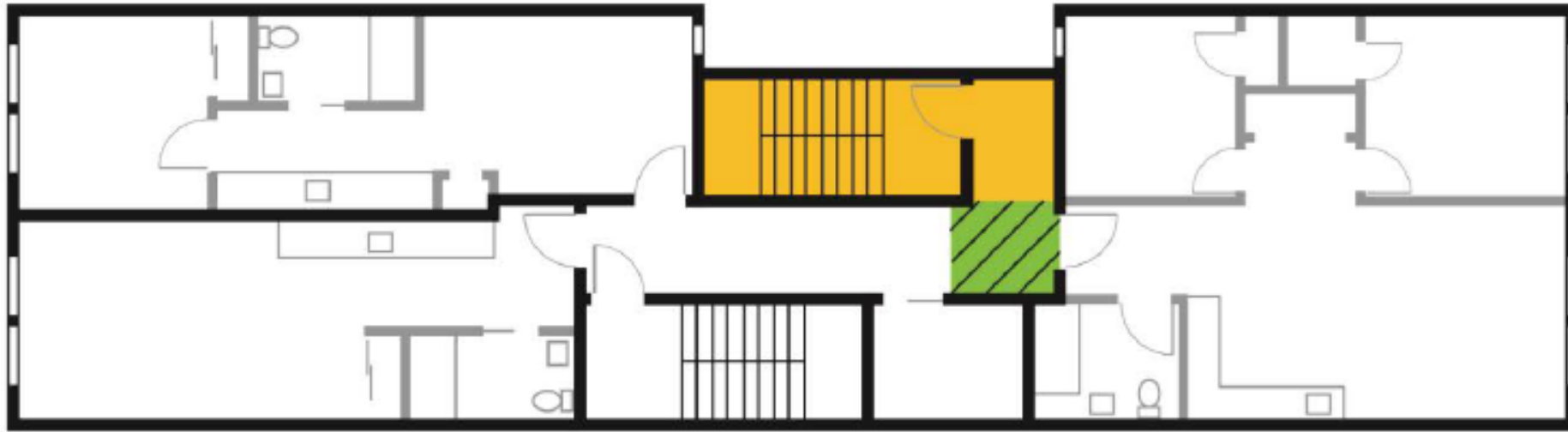
Area: 2,000 square feet / floor x 6 floors = 12,000 square feet

Cost with two staircases: \$3 million

Cost with one staircase: \$2.6 – 2.8 million

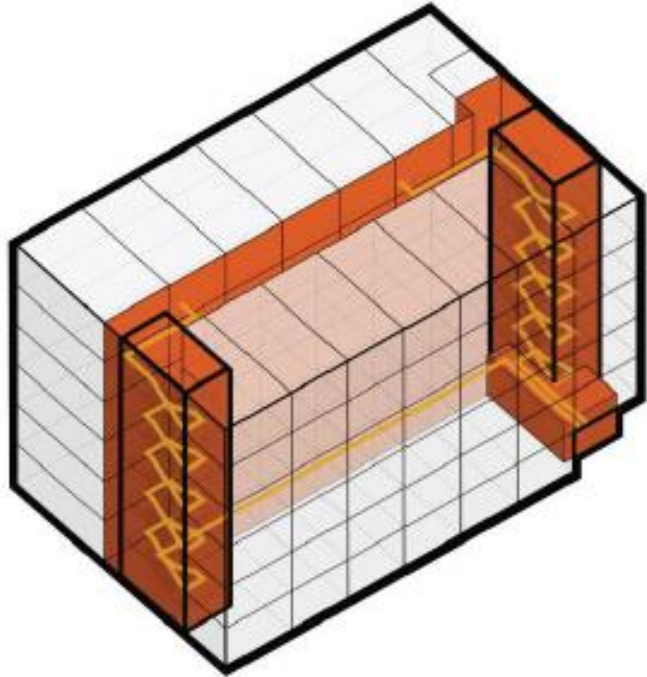
Cost savings: \$180,000 - \$390,000

Having One Stairway, Less Corridor Space Increases Net Rentable Area, Could Let Small Apartment Buildings Pencil



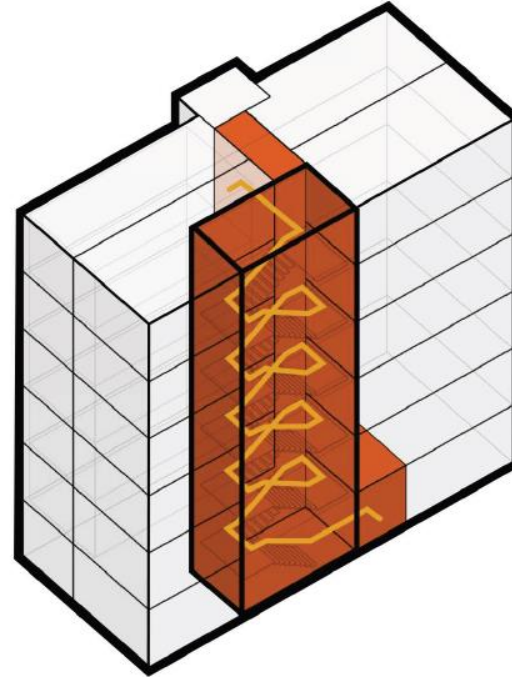
Notes: Drawing of 101 Storms Ave., Jersey City, New Jersey. In this example, the second stairway (in yellow) consumes 7% of the space, and 2% (in green) is rendered unrentable, because it is in the common corridor rather than inside the apartment on the right.

Two-stair vs. Single-stair layout



**DOUBLE-LOADED CORRIDOR
SIX STORY APARTMENT BUILDING**

Source: SAR+ Architects



**SINGLE-STAIR
SIX STORY APARTMENT BUILDING,
CURRENTLY ALLOWED IN SEATTLE**

Seattle, New York City, Honolulu, and many European and Asian countries currently allow mid-rise single-stair buildings

Other U.S. jurisdictions do not

Single-stair buildings fit on small infill lots in Seattle



Photo Credit: Showcase.com

Z APARTMENTS (23 units)
1109 N 92nd St
Market rate apartments



Image Credit: nemantaber.com

8TH AVE NE (22 units)
4302 8th Ave NE
Market rate apartments

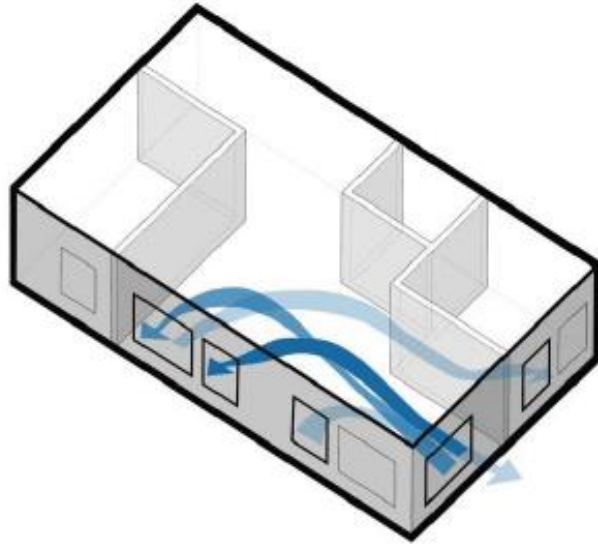
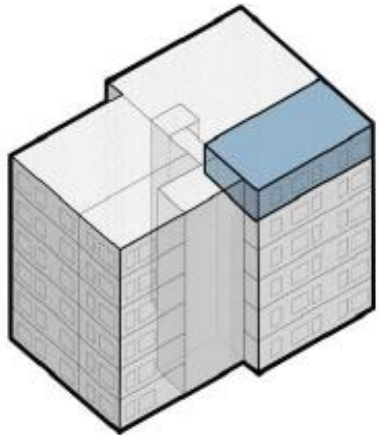


Image Credit: CAST Architecture

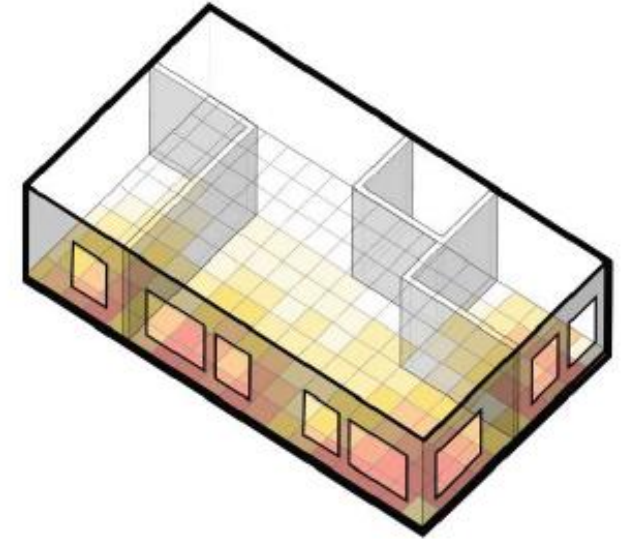
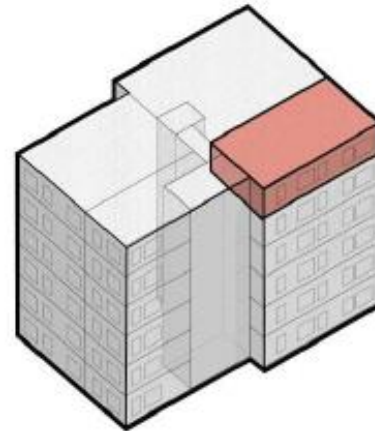
CAROL APARTMENTS (10 units)
4110 Fremont Ave N
Market rate apartments

Source: SAR+ Architects

Single-stair buildings have more natural light and ventilation



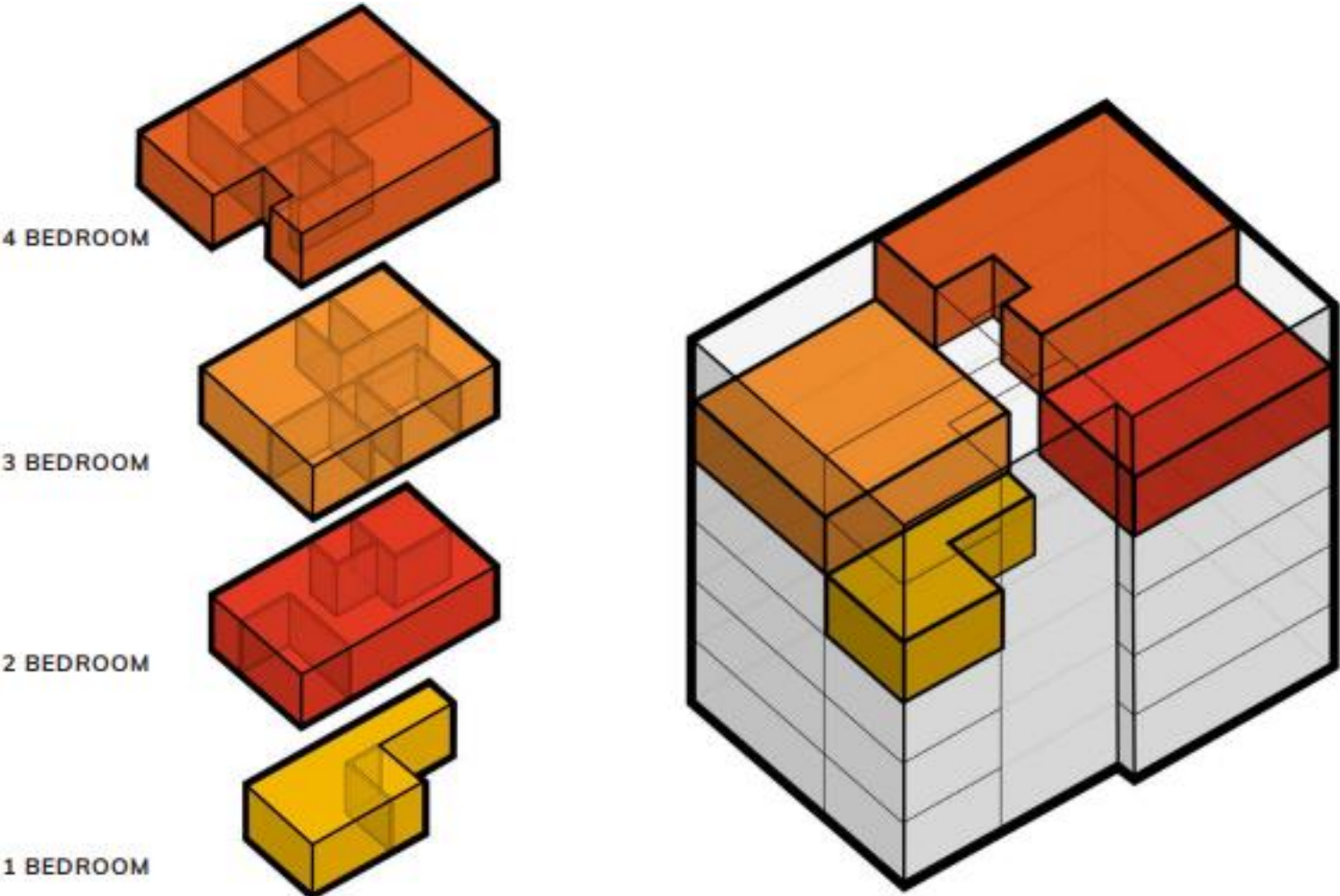
VENTILATION DIAGRAM



DAYLIGHT DIAGRAM

Source: SAR+ Architects

Single-stair buildings can fit family-sized apartments



Source: SAR+ Architects

Fitting on small lots, single-stair buildings can boost main streets, housing options

The New York Times

SQUARE FEET

Triangles, Crescents, Slivers: Can Odd-Shaped Lots Help Ease the Housing Crisis?

As needs escalate, more U.S. cities and states are making it easier to build on irregular and long-overlooked lots.

source: Ani Jo, Getty Images



Source: Robbie Caponetto, Southern Living



Source: J. Michael Jones, Getty Images

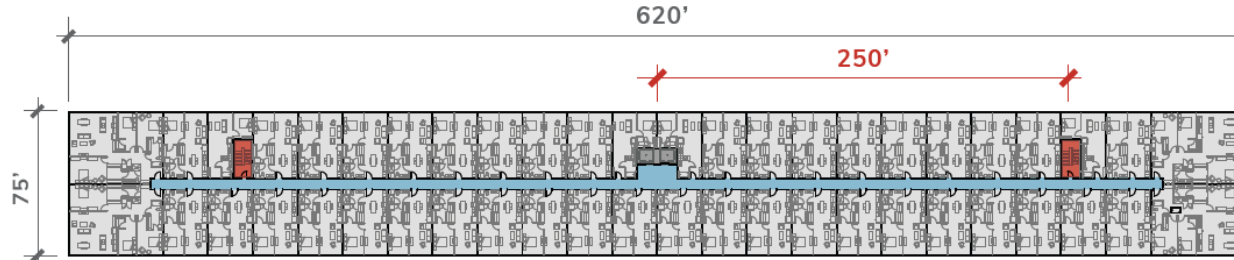




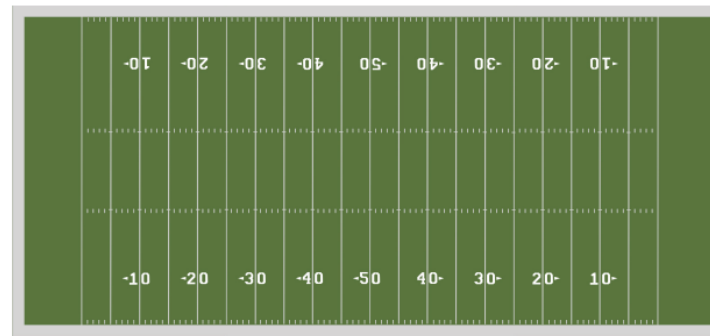
***Fire safety & single-stairway
buildings***

Most Residents of Two-Stair Buildings Are Farther From Exit Than Those in One-Stair Building

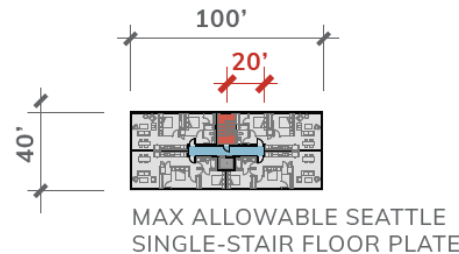
FLOOR PLATE COMPARISON



ALLOWABLE FLOOR PLATE PER 2021 INTERNATIONAL BUILDING CODE (IBC)



AMERICAN FOOTBALL FIELD



MAX ALLOWABLE SEATTLE SINGLE-STAIR FLOOR PLATE



Dual-stair building →

American football field →

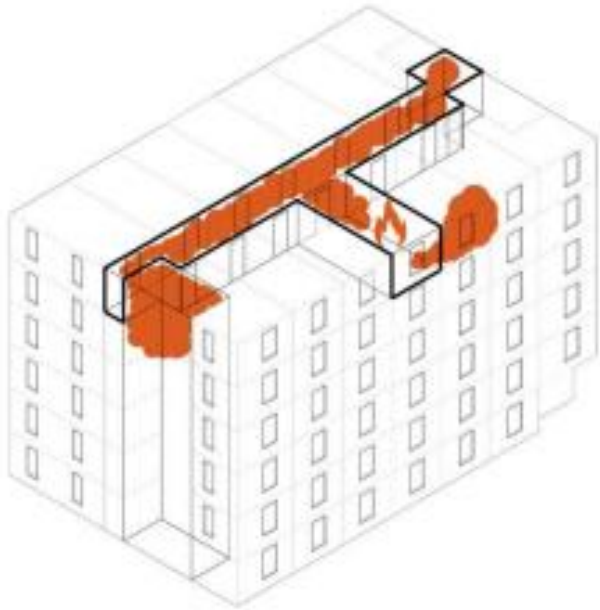
Single-stair building →

Single-stair buildings have fewer occupants per stairway, making evacuation faster



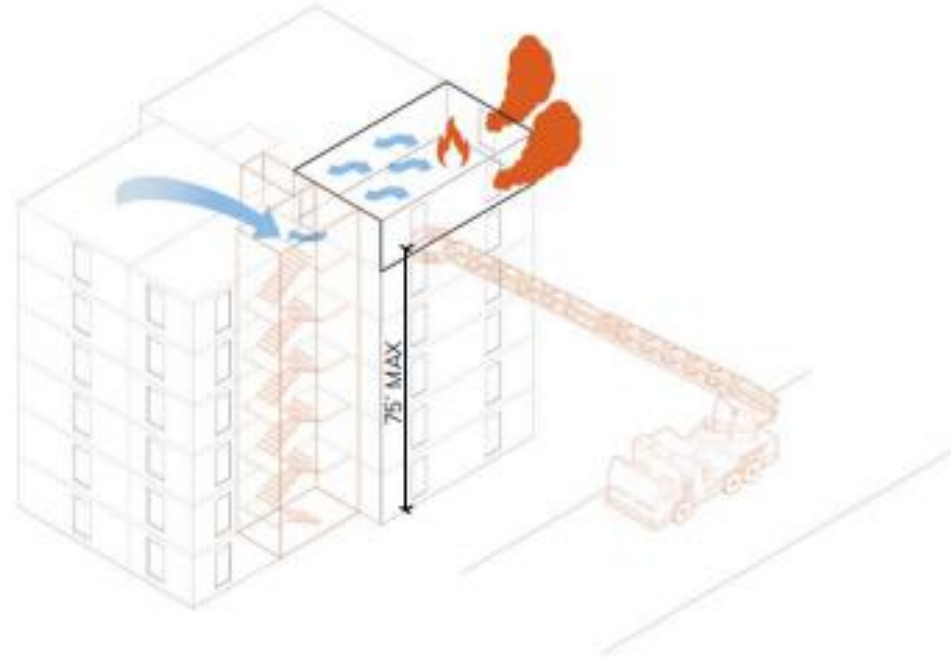
Source: SAR+ Architects, Center for Building in North America

Single-stair buildings use modern safety technology



Double Loaded Corridor

- Long distance from unit to exit
- Smoke spreads throughout complex

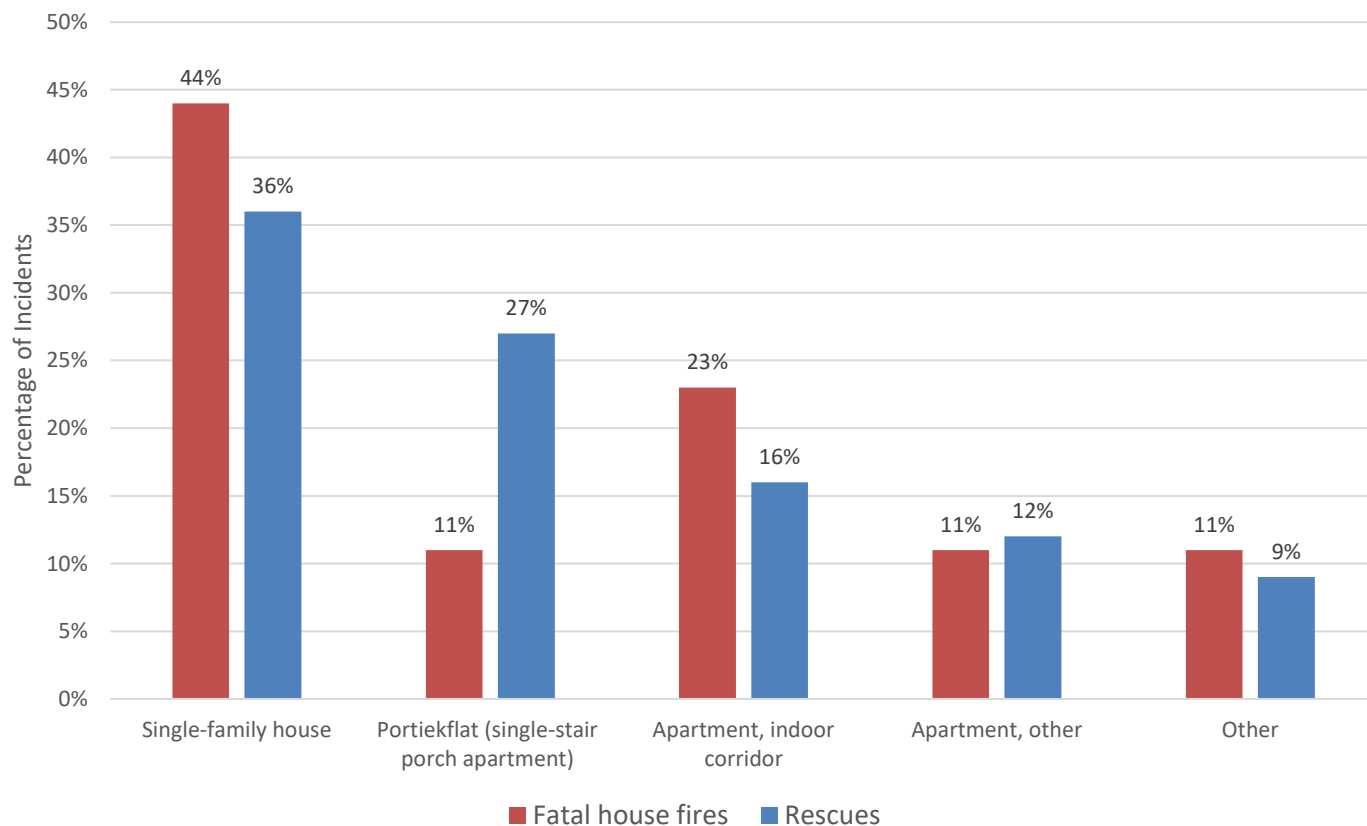


Point Access Block

- Short distance from unit to exit
- Pressurized stair pushes smoke out
- Fewer units impact by event

Source: SAR+ Architects

Research from the Netherlands: fatal fires and rescues by building type



- Dutch portiekflats (or portiekwoningen) are a type of apartment building where units share a communal staircase, typically 4 – 5 stories tall
- Each unit has a porch / balcony (or for some buildings, several units will share a common porch) from which people can await rescue
- These buildings have lower fatal fire rates than apartments with indoor corridors, suggesting single-stair buildings are safer

Source: Nederlands Instituut Publieke Veiligheid 2022

***New York City and Seattle:
Only two U.S. cities with a large number
of modern single-stair buildings***

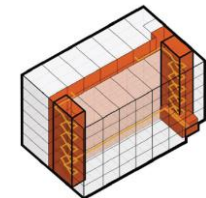
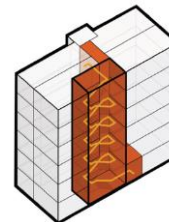
Fire fatality rate in single-stair & other residential buildings in NYC

Data from 2012-2024; NYC has approximately 4,440 modern single-stair buildings

	Single-stair 4-6 story	All other residential
Total Fire Deaths	3	465
Occupant-years of experience	617,801	102,489,392
Fire Death Rate per Occupant-Years of Experience	5 per million	5 per million

All three fire deaths (from two fires) in single-stair buildings occurred in unit and were not related to egress outside of the unit; the fires did not spread beyond their unit of origin.

Source: Pew and Center for Building North America analysis of USFA Home Fire Fatalities in the News database, NFIRS, PLUTO



Note: These figures are from publicly available data and are likely an undercount of the full number of fires that occur each year.

Seattle fire fatalities in single-stair & other residential buildings

Data from 2012-2024; Seattle is estimated to have a number of single-stair buildings in the hundreds

	Single-stair 4-6 story apartment	All other residential buildings
Total fatal fires	1	35
Total fire deaths	1	41

The fire death in a single-stair building occurred in unit and was not related to egress outside of the unit; the fire did not spread beyond the unit of origin.

Source: USFA Home Fire Fatalities in the News database and NFIRS

Note: These figures are from publicly available data and are likely an undercount of the full number of fire deaths that occur each year.

No signs of single-stair buildings causing high fire death rates

Causes are multifaceted, but results do not indicate danger

Country	Allows Single Stair for 4-6 floors	Fire Death Frequency (Fire deaths per 100k people)	Fire Lethality (Fire deaths per 100 fires)
Singapore	✓	0.03	0.07
France	✓	0.39	0.09
Germany	✓	0.43	0.16
Italy	✓	0.48	0.11
Ireland	✓	0.49	0.11
Great Britain	✓	0.51	0.16
United States	✗	1.09	0.27

Source: CTIF Report 2023 No. 28, <https://secondegess.ca/Jurisdictions>

Elements of safe single-stair construction

- Mid-rise heights
- Limited floor sizes (by unit count, area, or travel distance from unit door to exit)
- Stairway protection (self-closing doors, smoke control)
- Modern fire-safe materials and systems:
 - Sprinklers, smoke detectors, walls & doors designed to limit fire spread, fire-rated assemblies in the stairwell / staircase
- Any construction type can work (e.g., Seattle)

Single Stair Market and Policy Update

- JCHS / Utile / Boston Indicators 2024 study: mid-rise single-stair is salient
 - Analysis finds plenty of vacant / underused lots available within 15 min of MBTA stations in Boston area
 - Could net up to 130,000 new units, closing about 2/3 of Boston area shortage
- 14+ states have passed laws to authorize, enable, or study single-stair buildings from 2023-2025, including 6 in 2025
- Austin, TX authorized single-stairway buildings and has permitted its first mid-rise single-stair building

Fire Safety Summary

- New apartment buildings have very low fire death rates (6x lower than older ones)
- New single-family buildings are also safer than old single-family
- Building more apartments provides large improvement in fire safety
- Modern single-stairway apartments are built to code, with safety in mind
- New York City's experience: same rate of fire death as in other residential
- Mid-rise single-stairway building can help close housing shortage, improve fire safety



Thank you!

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