Homeowner Involvement in Urban Flood Risk Reduction

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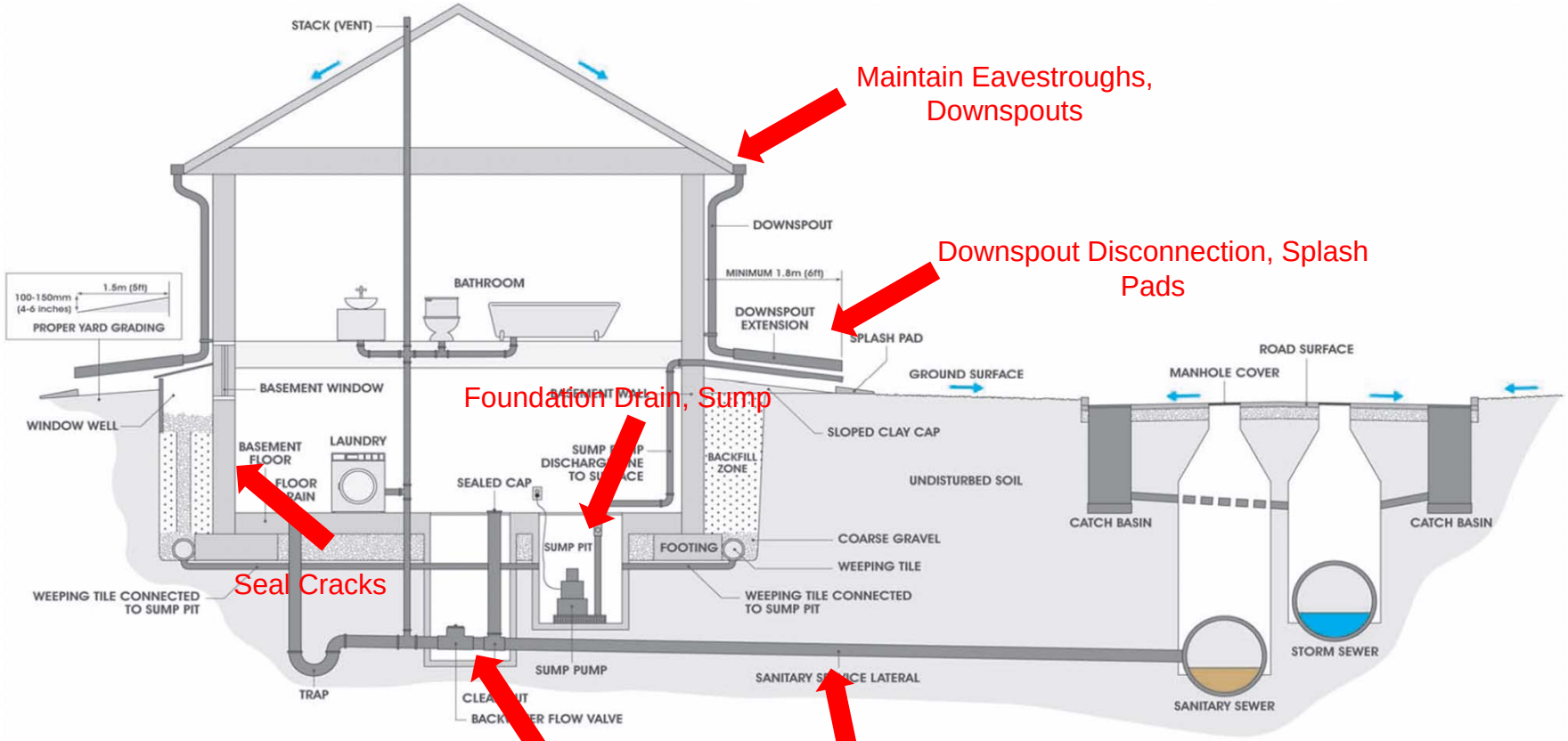
Basement Flood Symposium: May, 2011

Introduction

- Homeowner-level urban flood mitigation
- Encouraging lot-level mitigation
- Perception studies
- Study results
- Implications

Lot-Level Measures



Behavioural Measures

- Report events to municipality, ask municipality for information
- Talk to your insurer about coverage
- Do not pour FOGs down your drain
- Maintain lot grading and plumbing systems
- Investigations, permits, inspections
- Leave basement unfinished

Encouraging Homeowner Action

- Education
  - Public meetings associated with EAs
  - Meetings focused on affected neighbourhoods
  - Meetings focused on plumbing measures
  - Mass media, brochures, handbooks, websites, etc.
  - Insurance providers
- Subsidy programs

Subsidy Programs

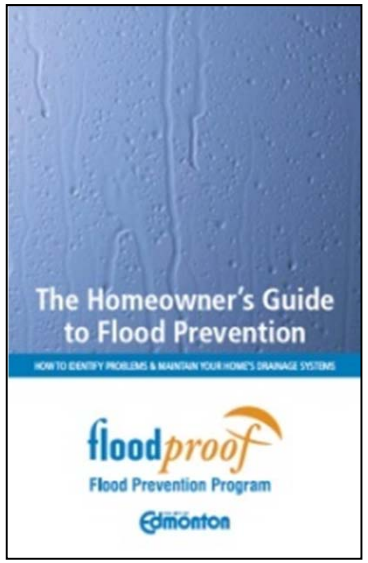
- Toronto
- Brantford
- Edmonton
- London
- Ottawa
- Halton Region
- St. Catharines
- Welland
- Niagara Falls
- Hamilton
- Saskatoon
- Vaughan
- Durham (loan)
- Peel/Mississauga
- Sudbury
- Winnipeg
- Brandon

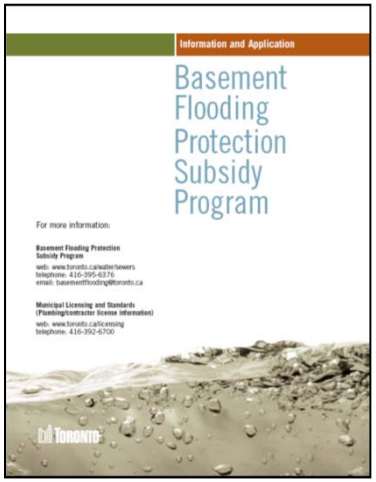
Max grant generally ~$3,000

80% up to $2,800 for BW valve and sump-pump in **Toronto**

60% up to $3,000 for BWV/Sump in **Winnipeg**

Range for backwater valve: $500 in Niagara Falls to $1,250 in Toronto



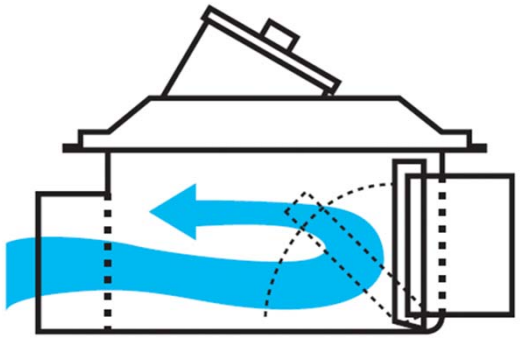


Subsidy Programs

- Focused on flooding caused by sewer backup
- Programs available to:
  - All homeowners
  - Risk homeowners
  - Historically flooded homes
- Some require notification of future homeowners of flood reduction measures
  - E.g., Niagara Falls
- Some require drainage/plumbing inspections by municipal representatives
  - E.g., St. Catharines, Halton

Standards and Bylaws

- Lot grading
- I/I reduction at the property level
  - Eavestrough downspout connections
  - Foundation drains – sanitary sewer (e.g., Durham Region since 1983, Peterborough since 1991, Sault Ste. Marie since 1968)
- Backwater valves in new development
  - Code interpretation
  - "…where a *building drain* or a *branch* **may** be subject to *backflow*, a gate valve or *backwater valve* **shall** be installed…" (NPC Section 2.4.6.4.(3))



Courtesy: Mainline Backflow Products, 2008

Insurance Approaches

- Education materials
- Incentivizing mitigation
  - Sumps and backwater valves mentioned most often
- Incentives may take several forms:
  - Availability
  - Caps (e.g., for more than $10,000 in coverage, mitigation may be required)
  - Premiums
- Sewer backup questionnaires

Data Source: Compu-Quote, 2010

Hazard Perceptions

- Frequent hazard denial, denigration
  - Low probability events
  - “It won’t happen to me”
  - Misinterpretation of extreme event statistics
    - E.g., 1 in 100 yr storm
    - Gambler’s fallacy
- Infrequent adoption of risk reducing adjustments
  - Up-front investment in risk-reduction not viewed as worthwhile for low probability events
  - Moral hazard – insurance and public relief

Bollens *et al.*, 1988; Burton *et al*., 1993; 1978; 1968; Kates, 1962; Kreutzwiser *et al.*, 1994; Kunreuther, 2006; Laska, 1986; McPherson & Saarinen, 1977; Shrubsole *et al.*, 1997; Wong & Zhao, 2001; Yoshida & Deyle, 2005

Hazard Perceptions

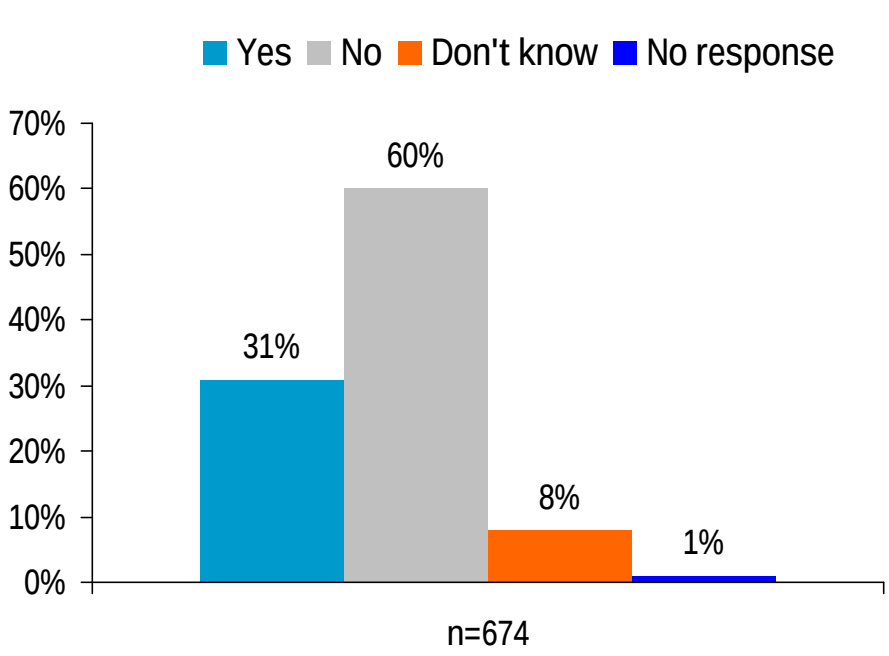
- Reliance on governments to reduce risk
  - Reliance on structural adjustments
- Transfer of blame regardless of severity of events
- Strong correlations between disaster experience and investment in risk reduction
  - Window of opportunity

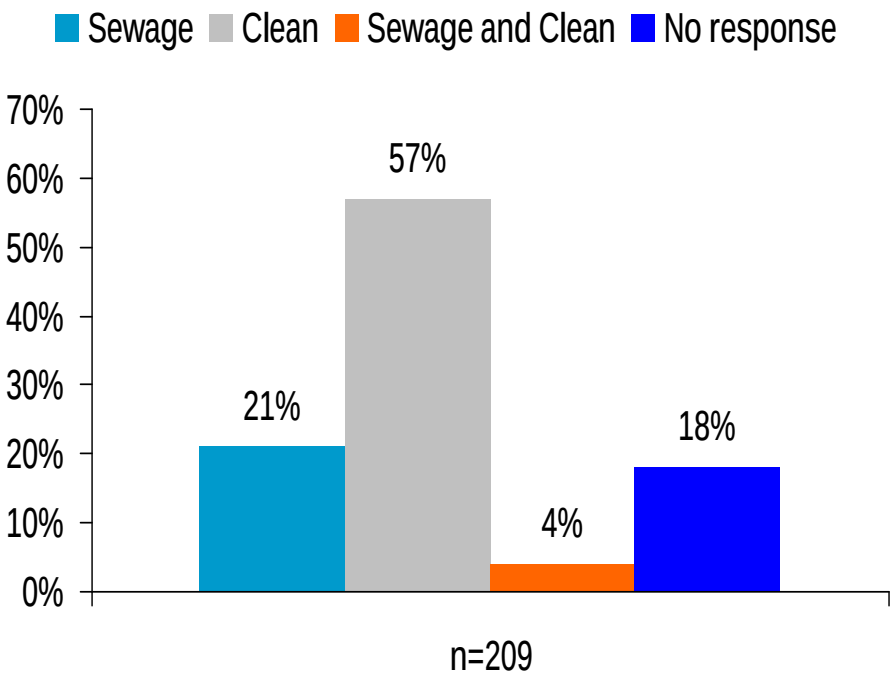
Bollens *et al.*, 1988; Burton *et al*., 1993; 1978; 1968; Kates, 1962; Kreutzwiser *et al.*, 1994; Kunreuther, 2006; Laska, 1986; McPherson & Saarinen, 1977; Shrubsole *et al.*, 1997; Wong & Zhao, 2001; Yoshida & Deyle, 2005

Perception Studies

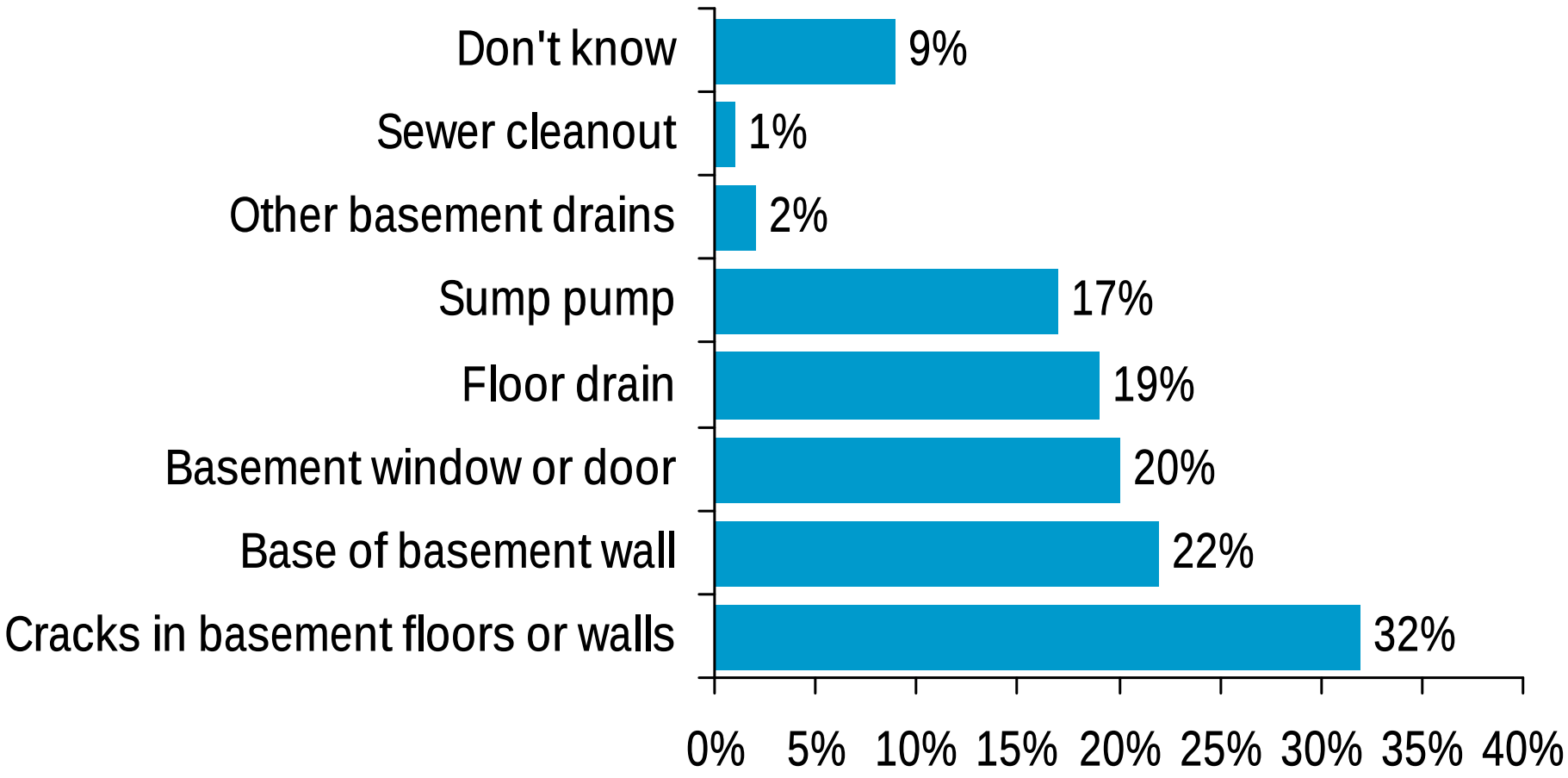
- Peterborough
  - 2005
  - Self administered
- Toronto & Edmonton
  - 2007
  - Phone interview
- Sherwood Forest, London
  - 2010
  - Self administered/Face-to-face interview

Basement Flood Experience, London



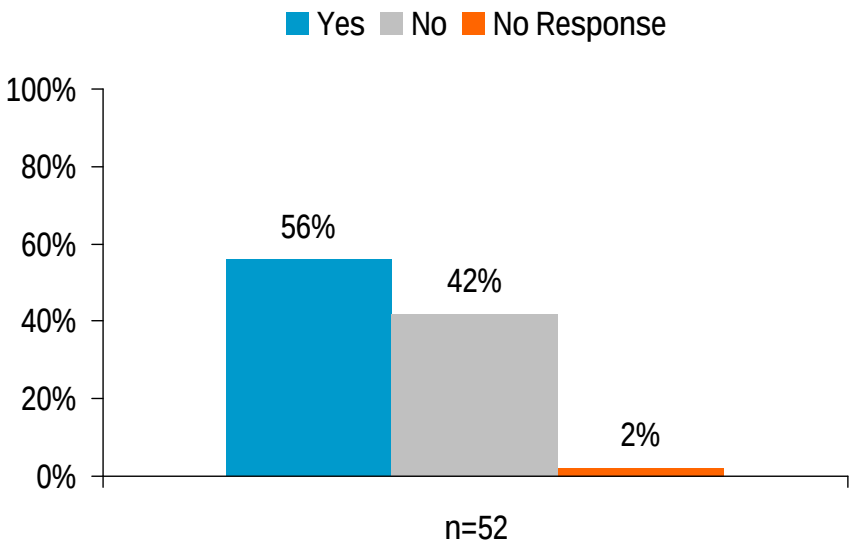


Source of Clean Water Flooding

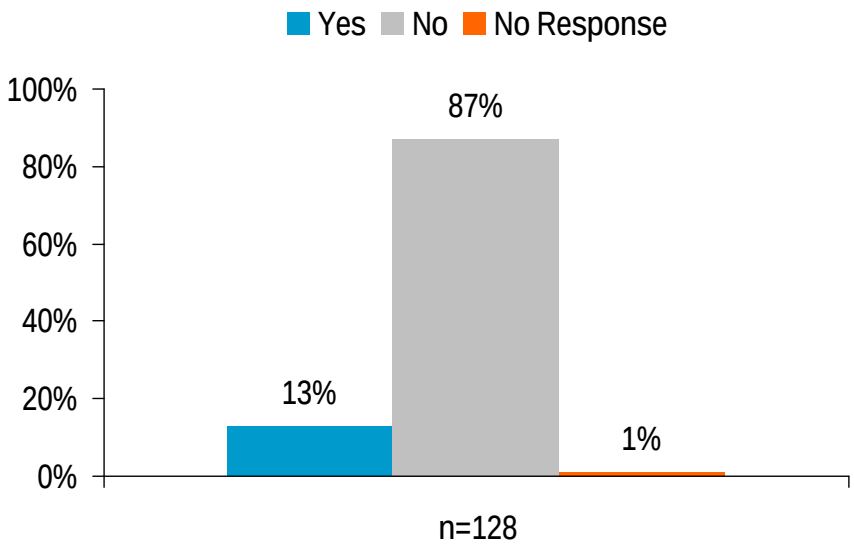


Reported to City?

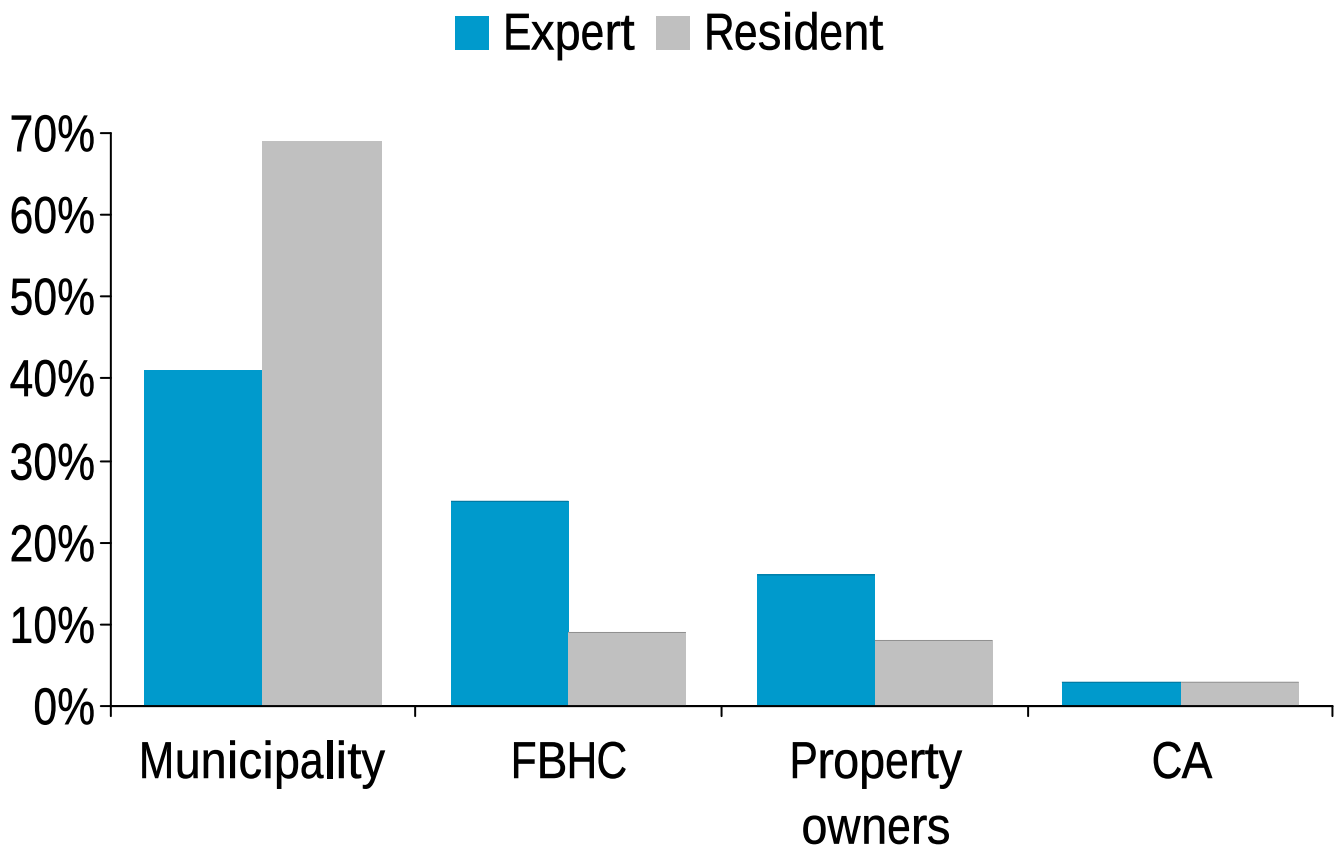
Sewage Flooding



Clean Water Flooding

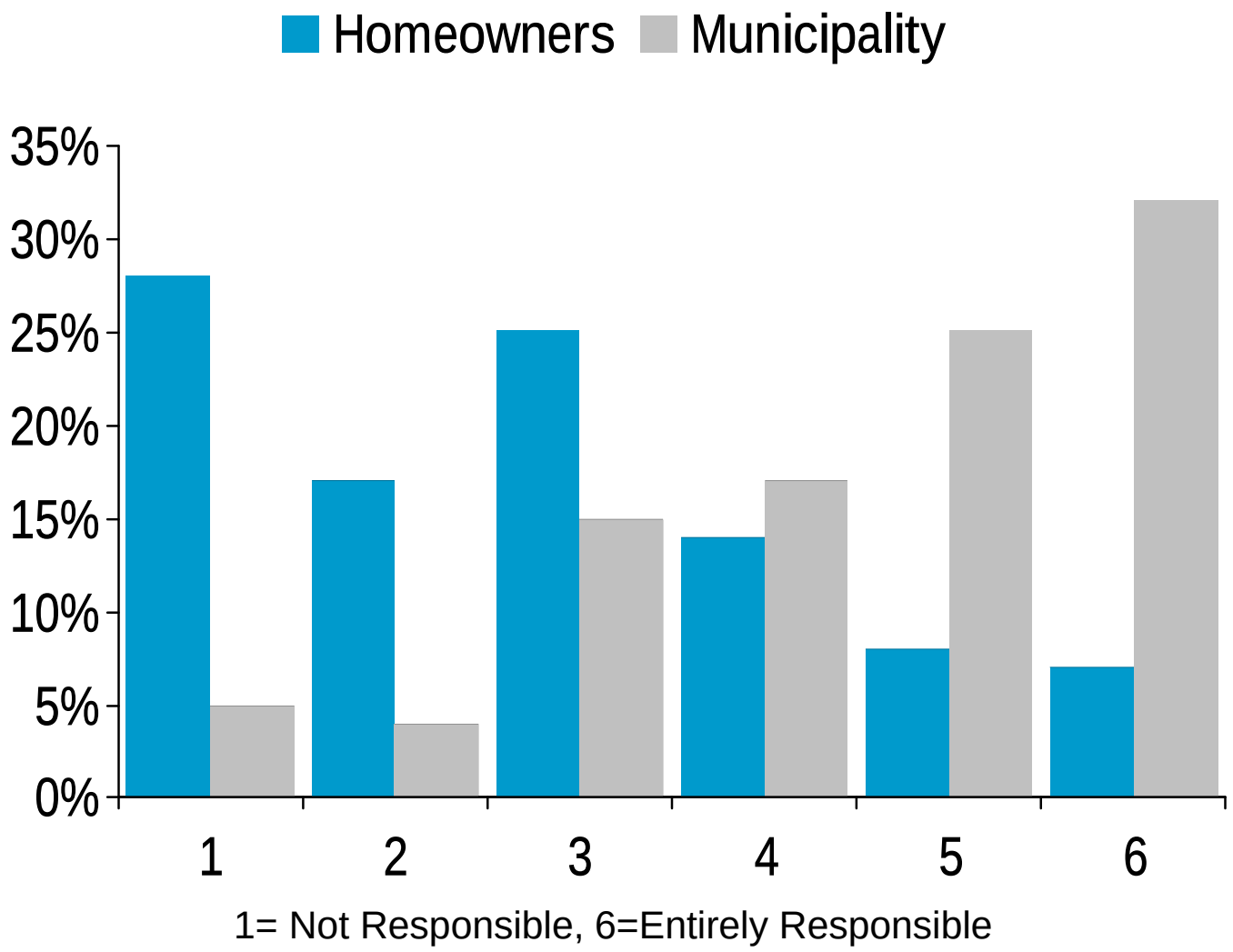


Perceived Responsibility, Peterborough



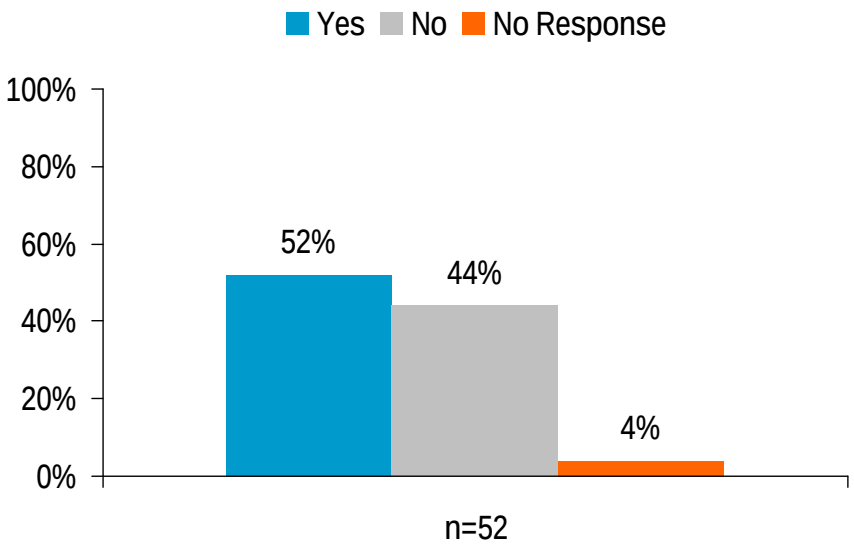
Attribution of Responsibility for Sewer Backup

Perceived Responsibility, Toronto

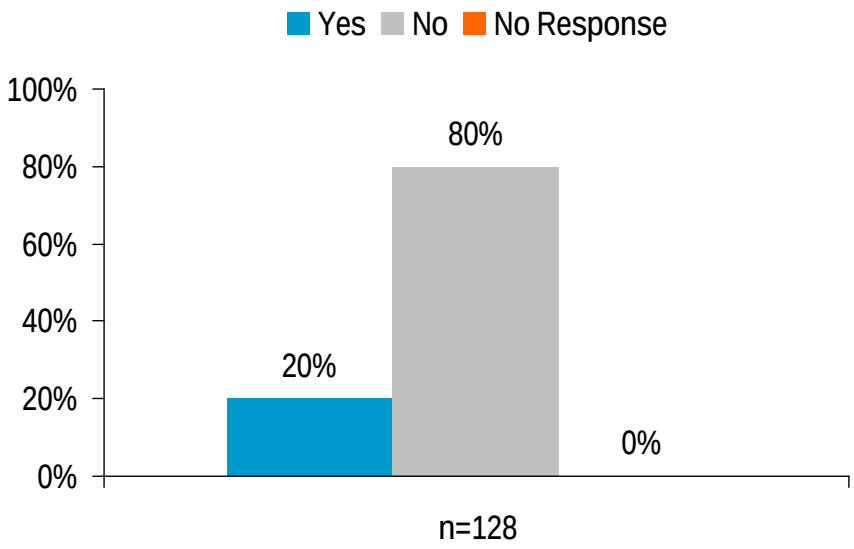


Made an Insurance Claim, London

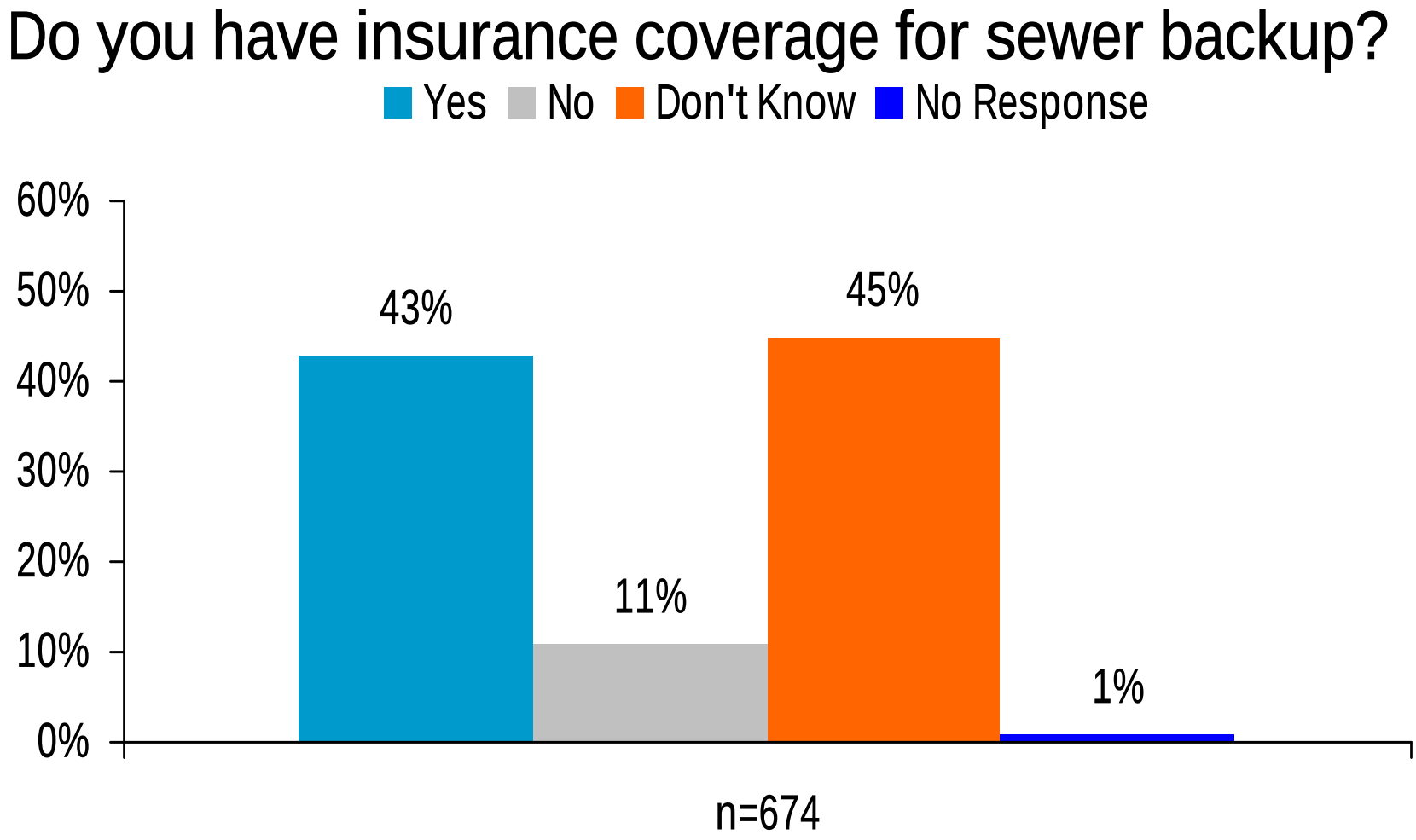
Sewage Flooding



Clean Water Flooding

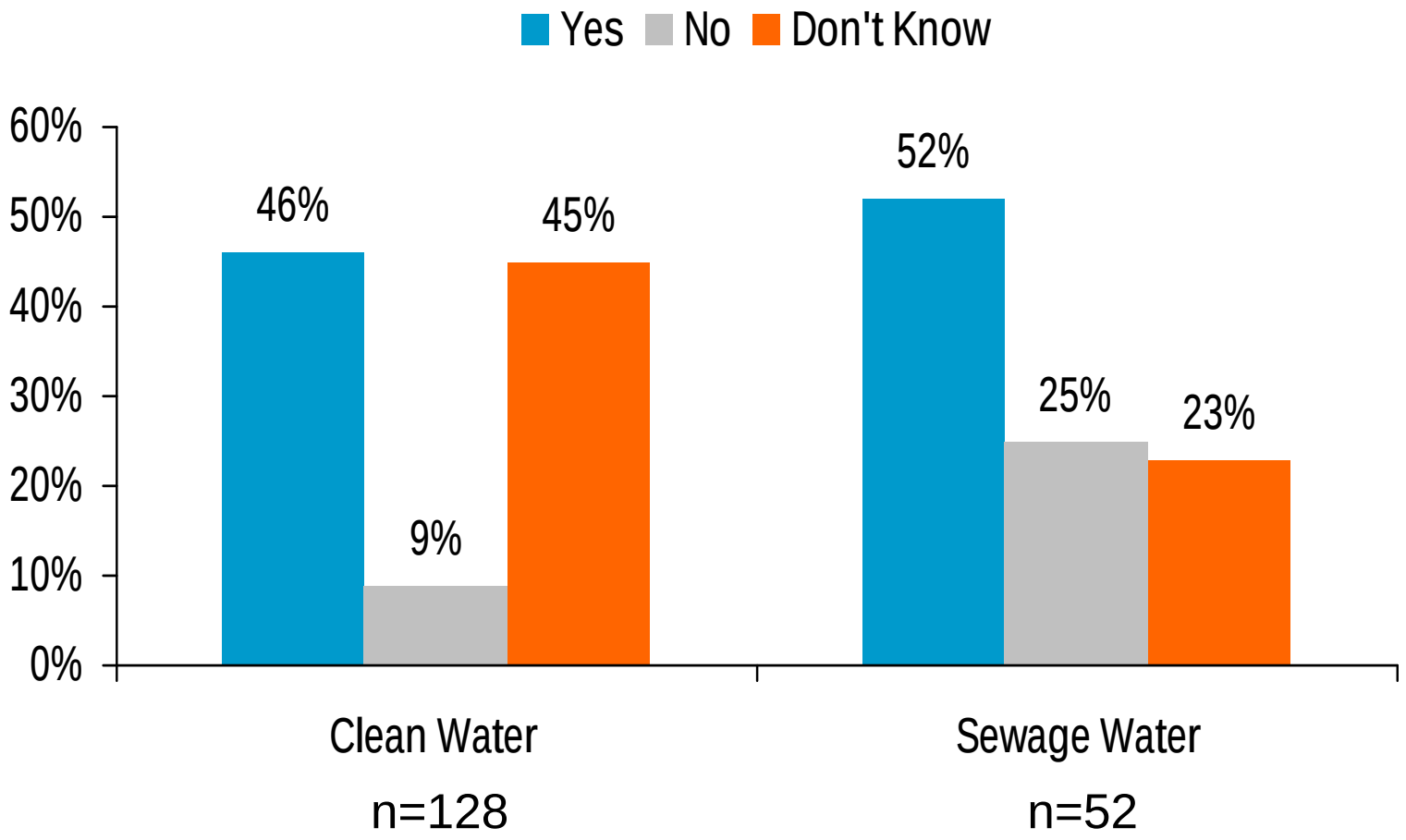


Insurance Coverage, London



Insurance Coverage, London

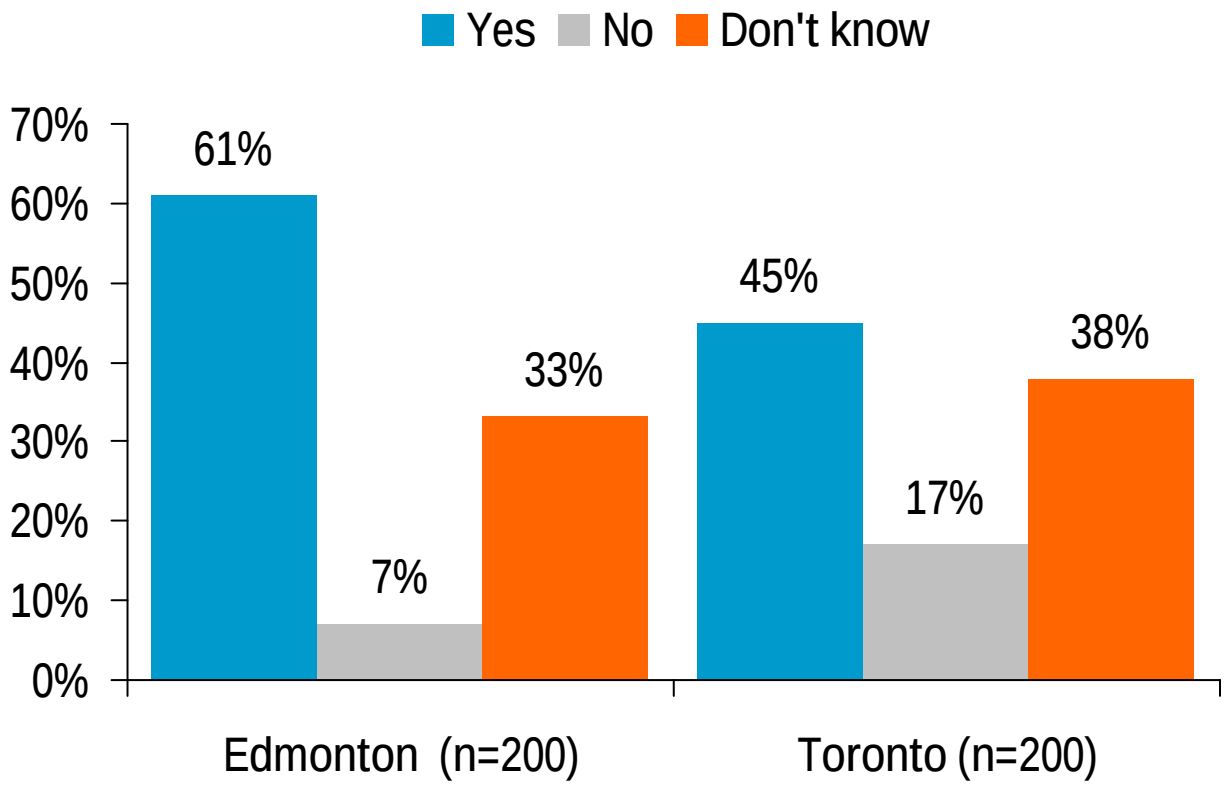
Do you have insurance coverage for sewer backup?



Insurance Coverage, Toronto & Edmonton

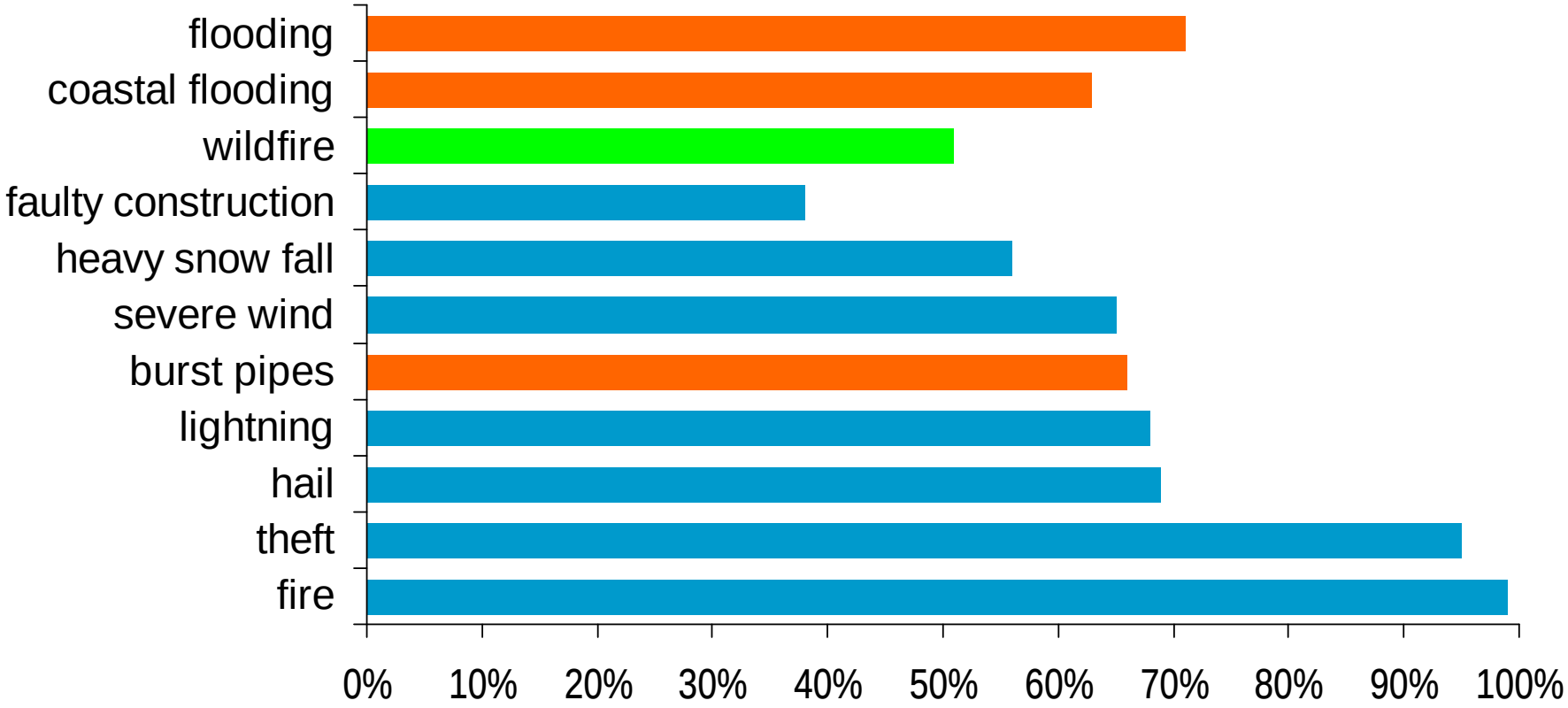
Do you have insurance coverage for sewer backup damages?

(Respondents who have experienced sewer backup in the past)



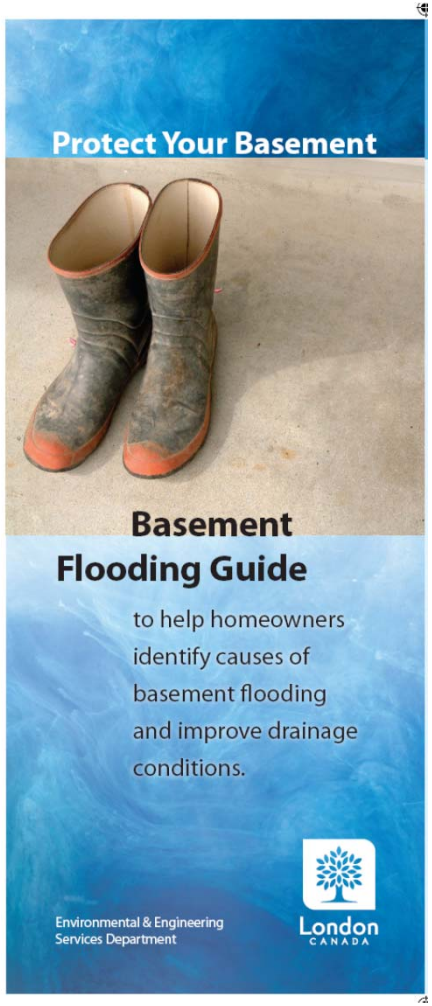
Perceptions of Insurance Coverage

Which of the following does a standard home insurance policy cover?

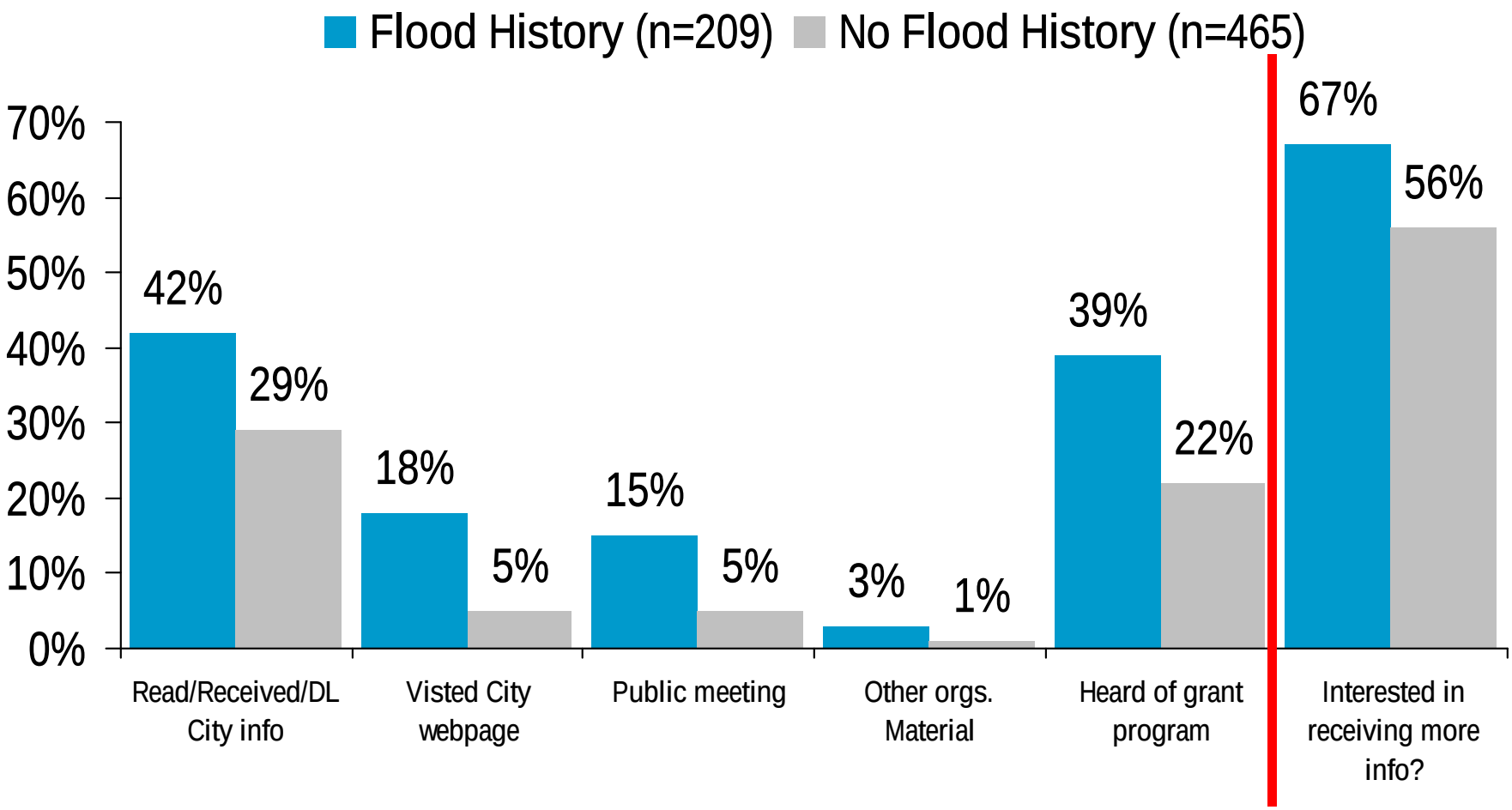


City Contact with Residents

- Information packages sent to residents in summer of 2009 by City of London
  - Letter of explanation
  - 1 page survey
  - Brochure
- Additional communications
  - Public meeting notification
  - Notification of downspout extension pilot program

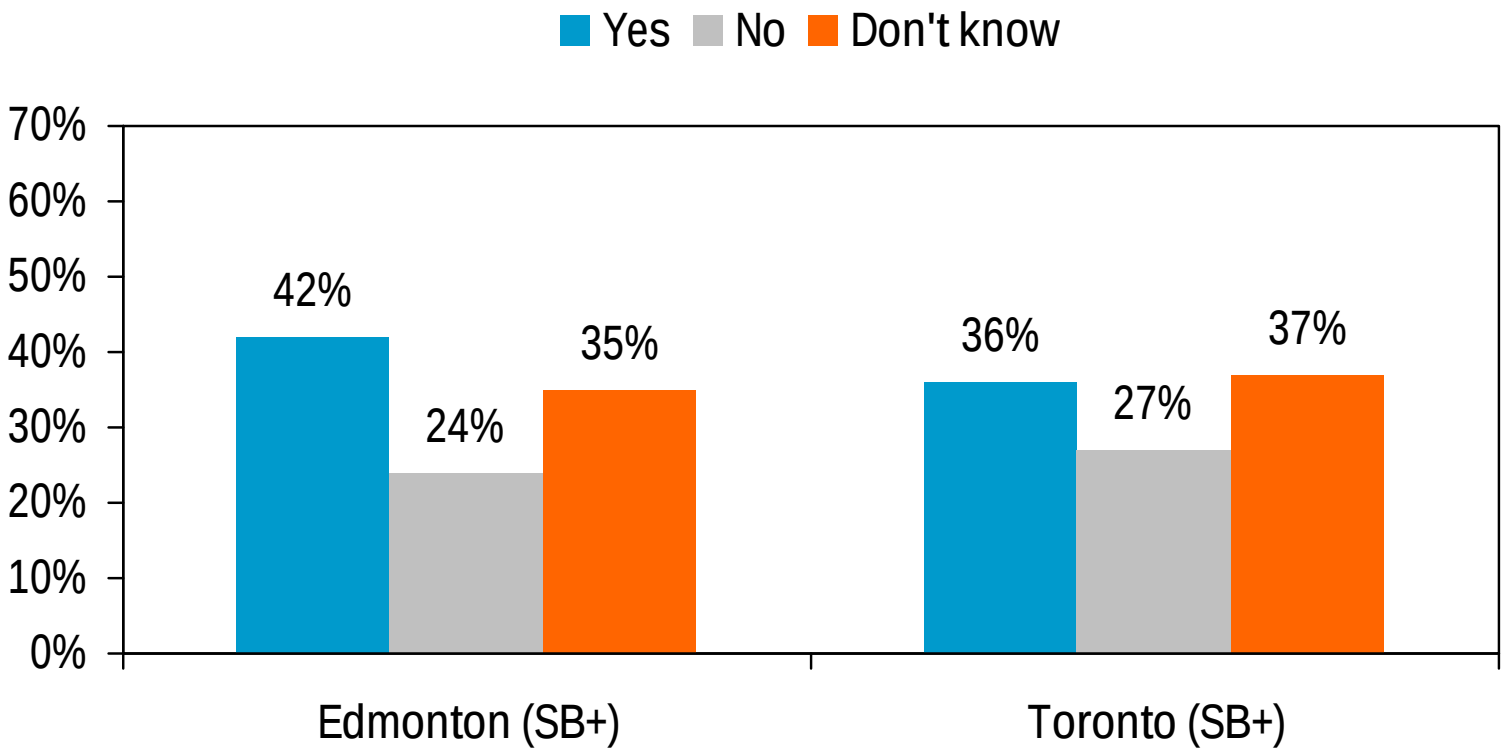


Knowledge/Information

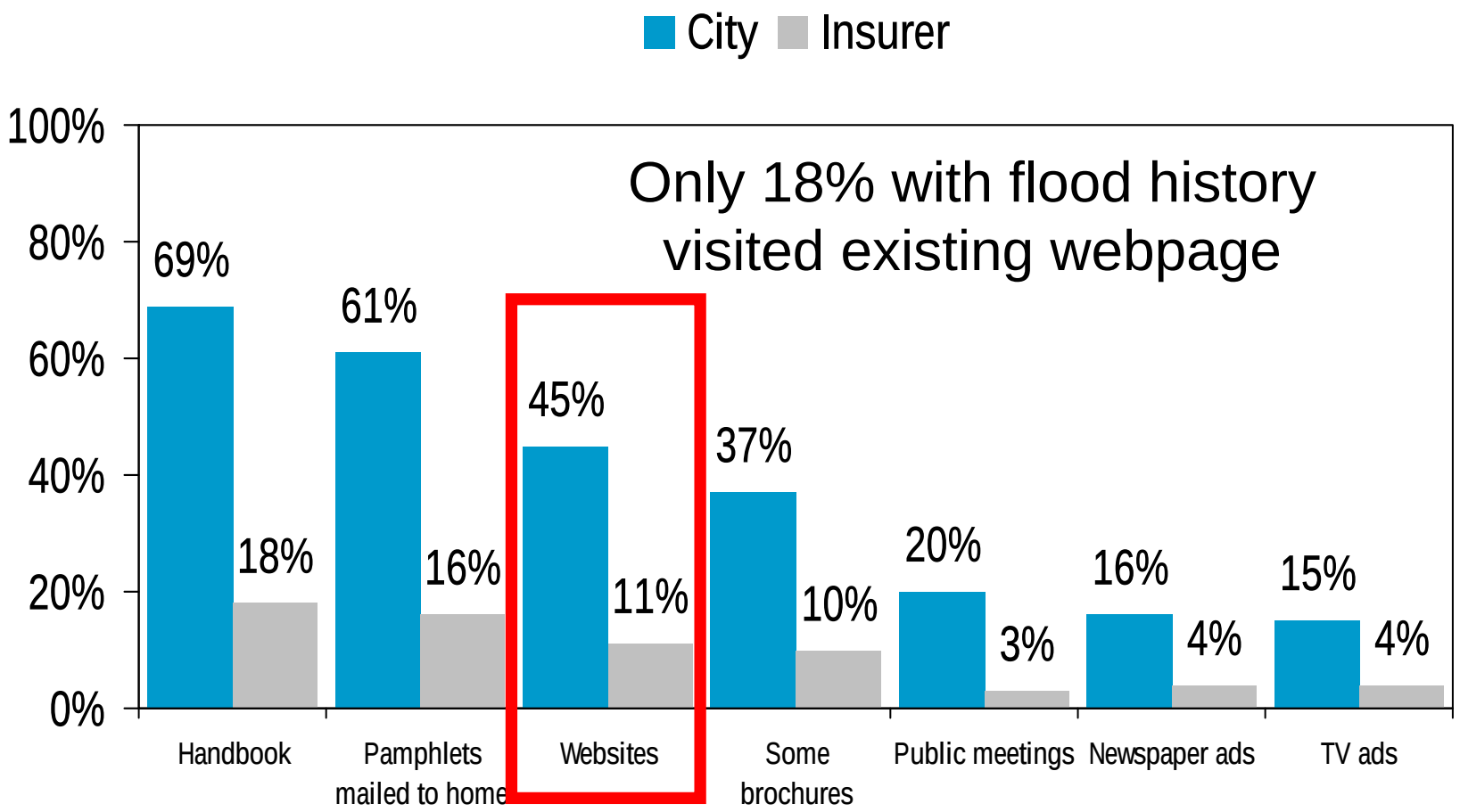


Knowledge of City Programs

Is your municipal government currently taking actions to reduce sewer backup in your city?



Information Preferences, London



- No respondents wanted info only from insurers

Survey Methods

Institute for Catastrophic Loss Reduction

Basement Flood Reduction Survey

Part D: Basement Flood Reduction Plumbing

Image #1 is a backwater valve.

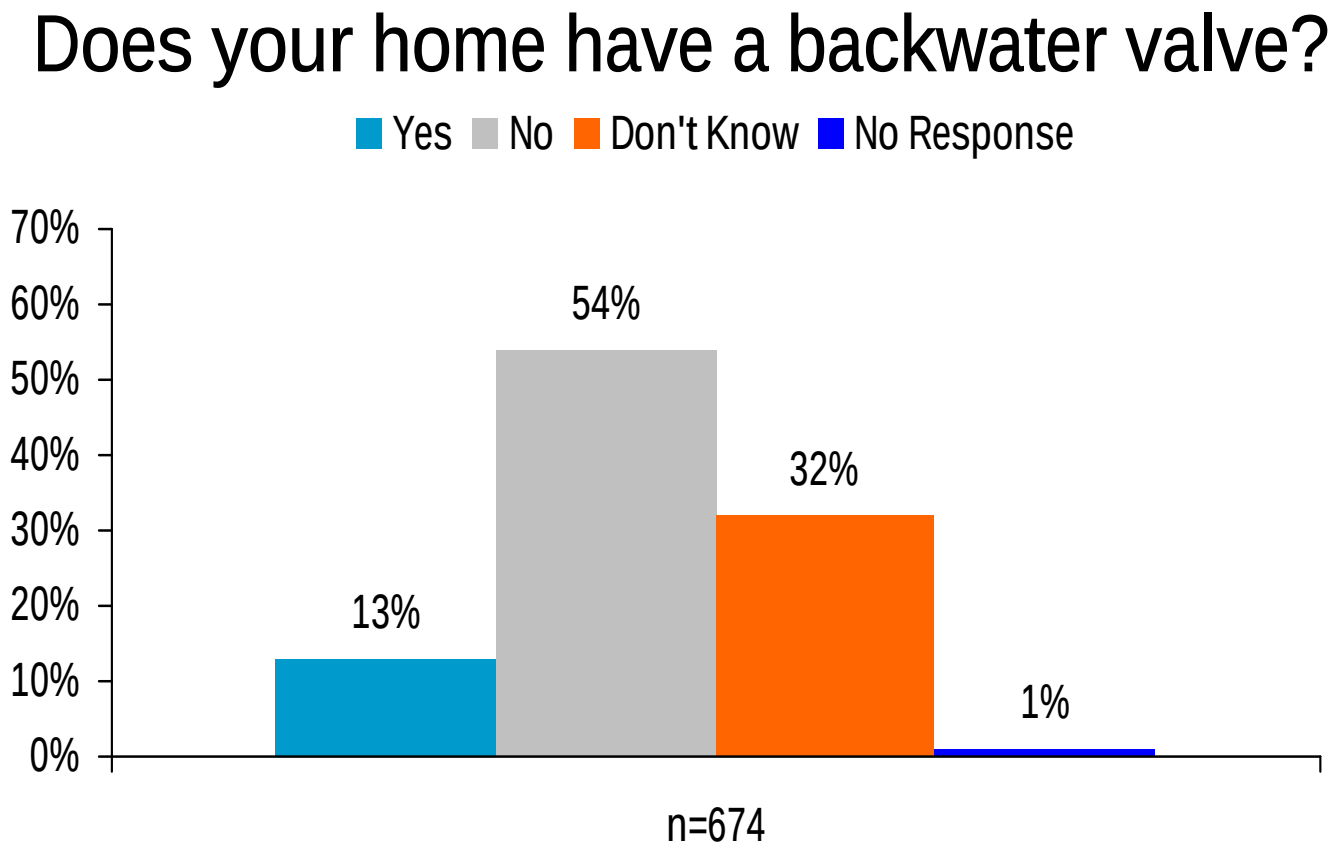
Image #2 is a backwater valve after it's installed. There is usually a cover over the valve.

Backwater valves are in the basement floor, usually located near the basement wall that is closest to the City street.

Sump-Pit and Sump-Pump

The pictures on the right are sump-pits and sump-pumps. These are located in the basement floor, close to the basement wall.

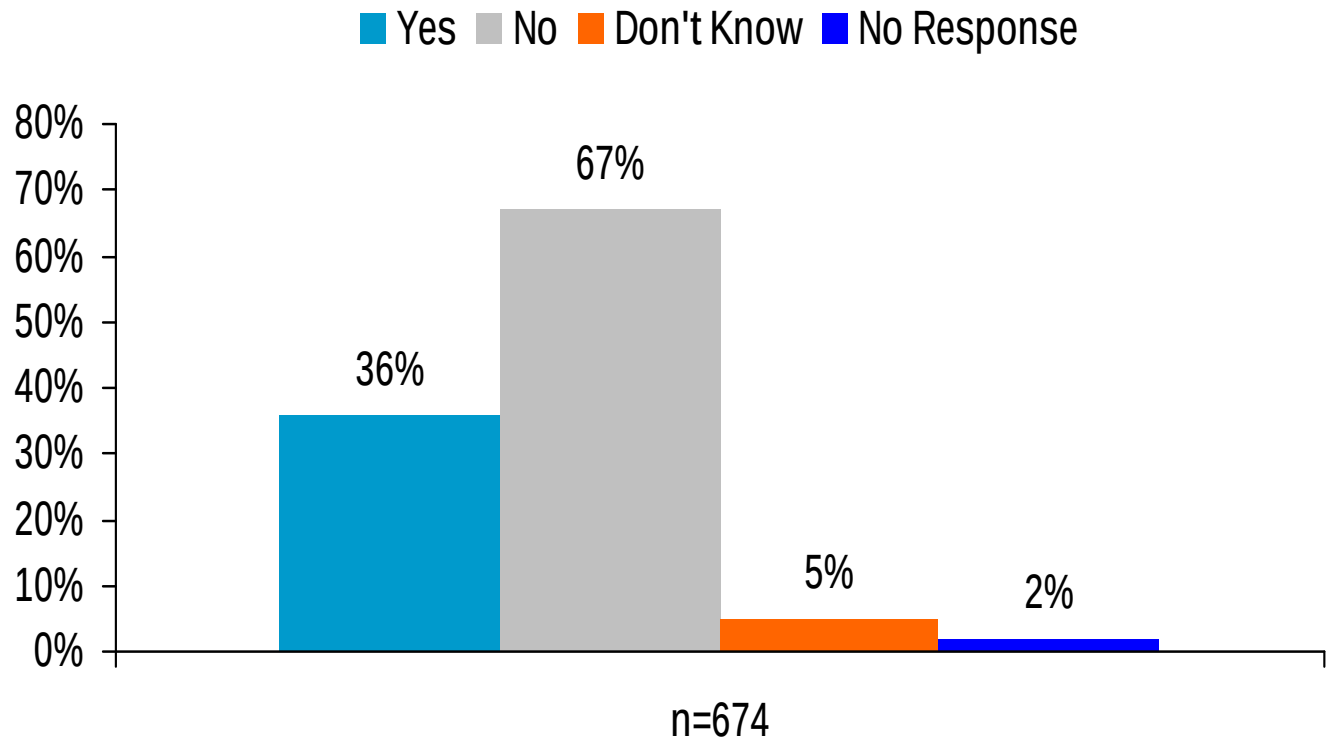
Backwater Valve



- 20 respondents indicated that they were responsible for the installation of their backwater valve

Sump System

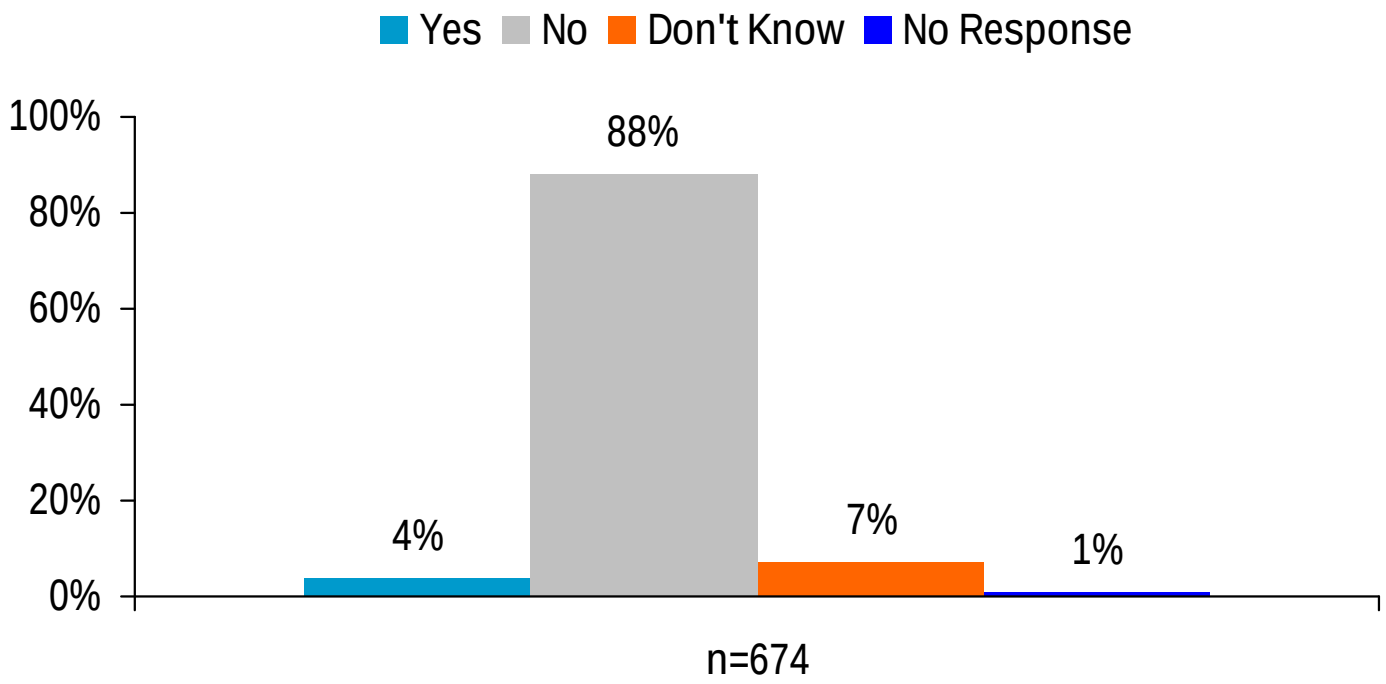
Is there a sump-pit and sump-pump in your basement?



- 18 respondents responsible for installation of sump

Downspout Connections

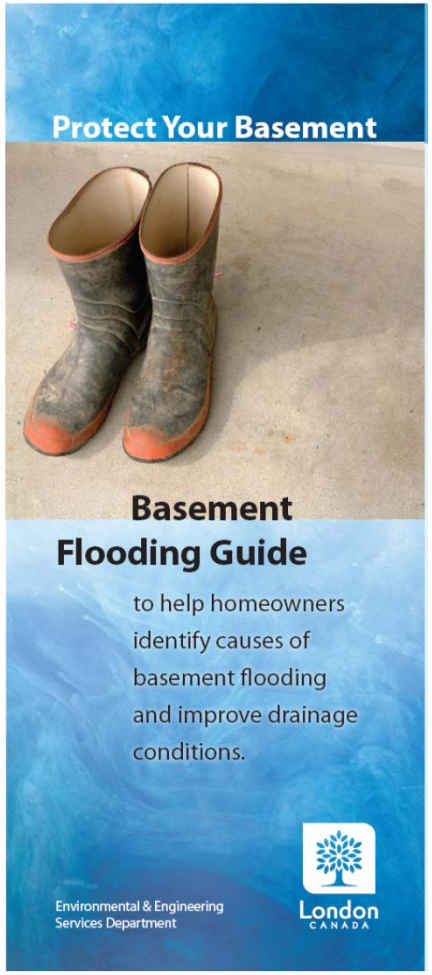
Downspouts connected into municipal sewer?



- No downspouts connected into municipal sanitary since development began in the area

Implications

- Low awareness of insurance coverage
- Low awareness of mitigation measures
  - BWVs specifically
  - Insurance company questionnaires
  - Are homeowners aware of maintenance requirements?
  - Homebuyers aware of mitigation measures?

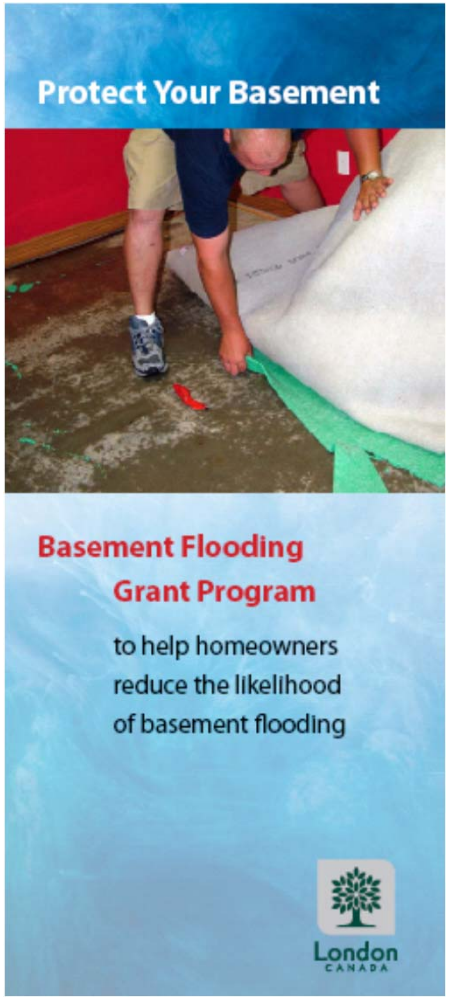


Implications

- Installation of mitigation measures
  - Few chose to install plumbing measures on their own
  - Exemplifies the importance of mandatory installation (e.g., building codes, by-laws)
- Relatively low rates of reporting events to the City
  - Issues with identifying sewer backup/flood prone areas
  - E.g., in Edmonton, 2004: 4,000 reports to City, but 9,500 insurance claims
  - Possible fears: Insurance coverage issues, home value reductions

Implications

- Frequent infiltration flooding
- Sump-pump related flooding
  - Concern over sumps in open-ended responses, consistency of information for residents
- Limited awareness of City flood reduction programs
  - Despite information mailings



Implications

- Results indicate that respondents strongly prefer info from municipality, however:
  - Theory suggests that consistent information should be provided through a wide variety of sources
  - Insurers/brokers could work with municipalities and serve as a conduit for info

Conclusions

- Homeowner level actions an important part of overall flood mitigation strategies
- Many strategies employed to encourage risk reduction
- Challenge is to affect behaviour
- Willingness to retrofit, retrofit vs. mandatory installation
- Insurance incentives: Good step--right measures?

Thank You!

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