New Houses May Lower Fire Risk and Responses

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A 48-hour Hackathon culminated in the discovery that housing age may directly affect fire risk and responses.

Director Jim McGowan, former ComEd lineman Bernard Foster, professor of Industrial Engineering Karen Smilowitz, and

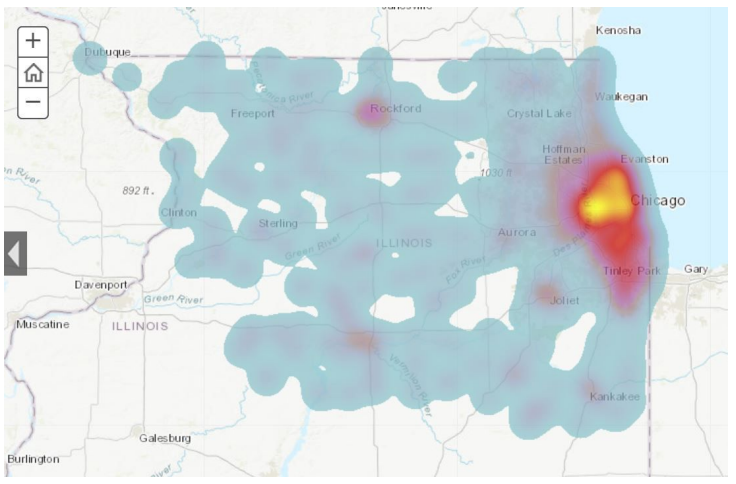
“Old houses are like kindling.” - Dave Perkins

Various interviews with community experts fueled our research. Interviewees included Information Management & Situational Awareness

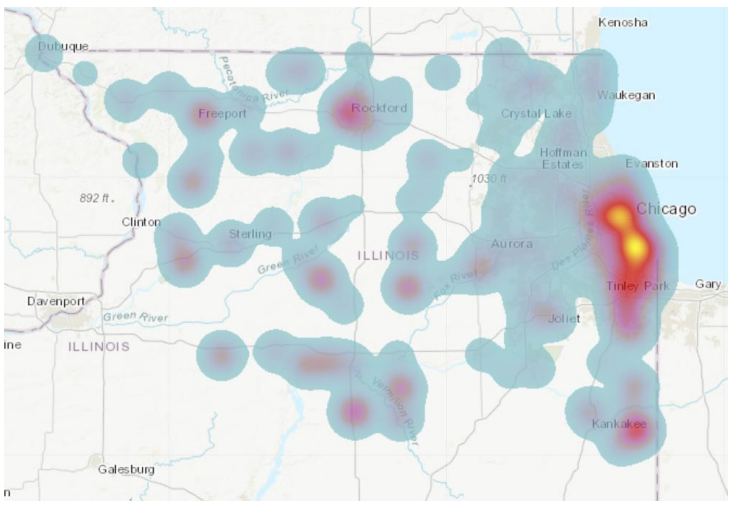
Northwestern Risk Management Senior Safety Technician Dave Perkins. As we discussed and researched, it became evident that the age of a house can affect the risk of fire. Dave Perkins, at one point in our interview, stated “old houses are like kindling.”

We took this comment and ran with it. Using fire response data given to us by the Red Cross, housing stock age data from the American Community Survey, and Chicago zip codes, we were able to find a correlation between older housing ages and higher numbers of fires.

We continued our investigation into whether or not newer construction could be a factor of lower response numbers for the Red Cross in the last 8 months.



ACS Housing Age by Zip Code (yellow = high, blue = low)



Fires as Percent of Housing Stock (yellow = high, blue = low)

The Math Behind the Curtain

The overall trend is hard to model, but we can see a firm upper bound on fire responses in zip codes with a certain percentage of new construction.

Looking at a plot of fire responses versus proportion of housing built after 2000 for a set of 31 zip codes that had enough data to work with, we see a clear frontier between areas with a high proportion of new housing and areas with a lower proportion of new housing. Specifically, there is a definite ceiling on the number of responses in more updated neighborhoods.

Although we should be careful extrapolating from the four years of data shared between the Red Cross and the ACS, it is reasonable to infer that housing stock will get younger (it certainly can’t get any older), and more and more zip codes will tend towards the newer-housing cluster and inherit the ceiling on number of fire responses. This could explain the drop observed by the Red Cross.

Figure 1: For zip codes with high proportions of new housing, an upper bound exists on fire responses

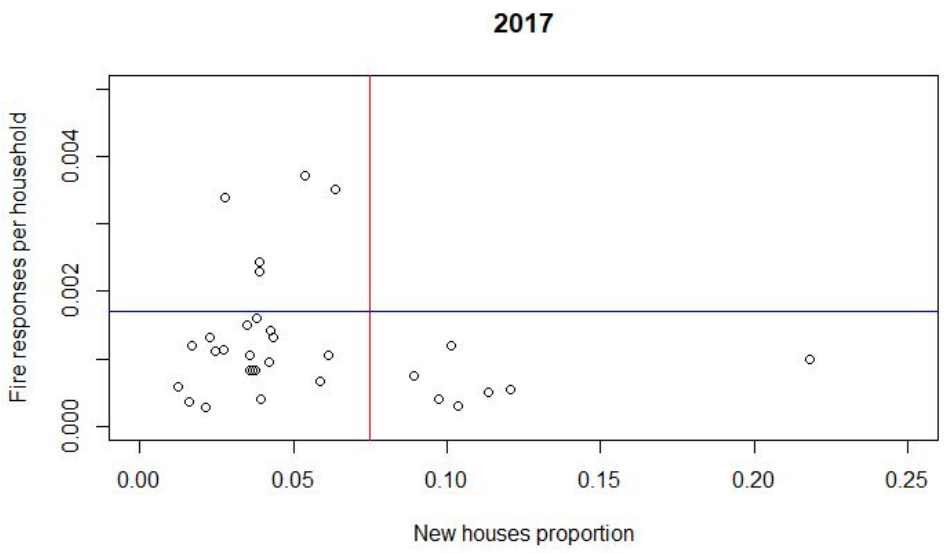
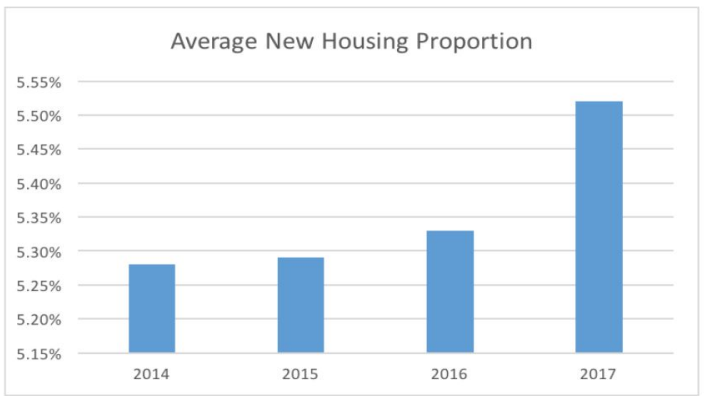


Figure 2. Proportion of new housing stock is increasing at an accelerating rate



	2014-15	2015-16	2016-17
% Change	.1%	.8%	3.7%