Six research areas that exist and need to be understood and considered:

1) **Time based modelling on evacuation**
    - Tests revealed that it took twice as long (10 minutes longer) to evacuate with one stair vs two.
    - Single stairwell egress caused the backing people up into lines in potentially smoke-filled hallways.
    - Tests showed the positive impact of two stairwells and that any reduction in routes caused slower evacuation times.
2) **Congestion in stairwells**
    - Evacuees with impairments create delays in evacuation for everyone and cause lines to form.
    - Took 6 seconds longer per floor.
    - Can be delayed even further when there was firefighting equipment in the way. Evacuation speeds slowed when encountering the fire floors
3) **Demographics of Occupants**
    - **Canadian Fire Safety Culture -** Different than Europe and the USA
    - Many people immigrating to Canada with different understandings of fire safety.
    - Demographics change over time – likely more elderly people in these buildings which increase risks due to reduced mobility.
    - Lower socio-economic backgrounds tend to place fire safety as a lower priority and leads to poor maintenance of systems.
4) **Vertical Means of Egress Comparison**
    - Capacity and evacuation time of Vertical means of escape (Stairs, Elevators
5) **Impact of Smoke Entering Stairwell**
    - Can enter in stairwell where firefighters are operating.
    - Human behavior study showed that people may still choose to use a smoke filled stairwell if they feel it is "good enough" or have not other way out.
    - Smoke was found to reduce movement speed by 30% until smoke density completely stops movement.
6) **Behavioral Studies on Human Movement**
    - Recent study out of the UK cites 273 sources**.**
    - Research done on World Trade Centre evacuations.

Some of the research is coordinated through the International Assoc of Fire Safety Science where they have a Human Behaviour in Fire (HBiF) group. This group provides looks at critical area of research that holds important implications for life safety, evacuation management, and disaster preparedness. They did a literature review and consolidation and had 302 cited sources.

The North York fire case study revealed that - Early notification and exiting were most successful in not encountering smoke in stairs. This means that they systems, speed of exit, exit options and education must be there. Smoke entered units in multiple ways. So, stay put is not an option – Grenfell Stay Put Failed. Other studies are from the UK and posted to the Government of UK's website. The most recent was just released in late March of this year