

# **Merging two paths safely: aging and obesity**

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# Introduction

- Aging
  - « grey tsunami »
    - The majority of drivers aged 65+ possess a driving license (3.25 million in 2009) representing 75% of all older people, Turcotte, 2012
    - Chicchino 2014 *Trend in older driver crash involvement rates and fragility an update*
- Obesity
  - World Health Organization (WHO) estimated that at least 400 million adults worldwide are obese, with higher rates in women than men (WHO, 2009).
    - Desapriya et al., 2011; Lavallière, Handrigan, Teasdale, & Corbeil, 2012

# Obesity

- Obesity is stratified by BMI using the recommended classifications for BMI adopted by the National Institutes of Health and the World Health Organization.
- This classification uses the following BMI ranges:
  - underweight (BMI  $< 18.5$  kg/m<sup>2</sup>)
  - normal weight (BMI 18.5 to 25)
  - overweight (BMI 25 to 30)
  - slightly obese (BMI 30 to 35)
  - moderately obese (BMI 35 to 40)
  - morbidly obese (BMI  $\geq 40$ )

# Objective

- The aim of this paper is :
  - to review the literature on the association between aging, obesity and traffic safety.
  - to promote insightful reflection and discussion around extrinsic and intrinsic factors on obesity and aging.
  - ***This is an emerging topic in the scientific literature that needs to address the present and future challenges related to improving driving safety.***

# Method

- Extensive searches were conducted on Pubmed, Scopus, ISI web of knowledge and Google scholar.
  - Keyword search terms were “Age\*\*”, “Obes\*” AND “Driv\*”.
- Once the literature was collected, it was sorted into a coherent resume of the general ideas and is presented for discussion.
  - (march 19(((aging) AND obesity) AND driving) AND ("1990"[Date - Publication] : "2013"[Date - Publication]))
  - Two researchers independently identified potential articles of interest (N =12).

# Results

- Only one article was directly related to aging, obesity and driving (N=1)
  - Frank, Kerr, Rosenberg, & King, 2010
- Extrinsic factors
  - Obesogenic environment
  - Mode of transportation
  - Facilitating physical activity and active transportation
- Intrinsic factors
  - Car fit – anthropomechanical design
  - Health related issues

# Extrinsic factors

- Obesogenic environment (built environment)
  - “built” environment may contribute to obesity and MVCs
    - Increasing urbanization and a tendency to design neighbourhoods that do not promote physical activity (Beatley & Manning, 1997; Zhao & Kaestner, 2010).
  - Despite the attempt to increase sustainable living quarters in cities (Cooper, Evans, & Boyko, 2009) many individuals purchase homes on the outskirts of the urban center and commit to a daily commute (Coughlin, 2009).

# Extrinsic factors

- Modes of transportation
  - With aging, shift from an independent source of transportation to a dependent source of transportation can be challenging for ones sense of autonomy
    - Edwards, Lunsman, Perkins, Rebok, & Roth, 2009; Ragland, Satariano, & MacLeod, 2005
  - As infrequent users of public transportation elderly drivers heavy reliance on privately owned vehicles is problematic.

# Extrinsic factors

- Facilitating physical activity and active transportation
  - each hour spent in a car was associated with 6% increase in the likelihood of obesity & each half-mile walked (daily) reduced the odds of obesity by 5%. Franck et al. 2004
  - Greater risk of being on the receiving end of a motor vehicle – pedestrian accident.
    - During the period 2000-07, elderly individuals (65 and plus) represented 22 percent of pedestrian fatalities (Transportation for America, 2011b) although they comprise approximately 13 percent of the population (Transportation for America, 2011a; U.S. Census Bureau).

# Intrinsic factors

- Car fit – anthropomechanical design
  - Seat belt
    - Elevated percentage of non-seatbelt users who are obese and overweight
      - (ORs: 0.89 (95% CI, 0.85 to 0.93) and 0.69 (95% CI, 0.66 to 0.73) for overweight and obese individuals, respectively)
        - » Schlundt et al. 2007
    - Lowest in morbidly obese occupants (10-15% less)
      - » Lichtenstein et al. 1989; Moran et al. 2001; Viano et al. 2008

# Intrinsic factors

- Health related issues
  - Pathological aging that might explain the higher implication of older drivers in collisions
    - Subzwari et al., 2009
  - Low mileage bias
    - Langford, Bohensky, Koppel, & Newstead, 2008;  
Langford, Methorst, & Hakamies-Blomqvist, 2006
  - Higher fragility / frailty in aging drivers
    - Li, Braver, & Chen, 2003

# Aging and Obesity

Images were removed on purpose.

- **50th percentile male Hybrid III dummy has a mass of ~78 kg (172lb) and a stature of ~175 cm (5'9") (BMI=25.4 kg/m<sup>2</sup>).**
- **95th percentile Large male Hybrid III Dummy weights 101.15kg (223lbs) and measures 1,88m (6'2") (BMI= 28,6 kg/m<sup>2</sup>).**
  - (S. G. Moran et al., 2002).

# Discussion

- Adjustment for potentially confounding variables
  - Age, gender, seatbelt use, seat position...
- How people sit and place their restraint system
  - Efficacy of restraint systems, human's response
- Limited prevention strategies
- BMI as an indicator of obesity.
  - Waistline measurement
    - Despres, 2009 ; Arbabi et al., 2003

# Conclusion

- No one will buy the “older” car
  - Coughlin, 2007
  - Neither the “obese” car
- Urban sprawl
- Inform public policy decision makers and researchers.
- ***Prevention and education are the first steps towards an integrated understanding of how aging and obesity affect driving safety.***

# Questions Thank you

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