Humans-Dogs.
One Health & One Welfare
Structure of Presentation

• Introductory Comments
• Global Dog Numbers
• Benefits of Dogs
• Health “Costs” of Dogs
• Conclusions
Introductory Comments

• Have been tracking dog populations and “overpopulation” since 1980

• Very surprised by lack of knowledge of dog demographics but, even more, by the apparent disinterest in accurate demographic data.

• USA estimates of dog ownership rates and dog numbers vary significantly according to survey and by state.
US Dog Population Estimates

- Considerable variation among four National US surveys of Pet populations – Very little discussion of differences by anybody?

State-by-state variation pf dogs/1,000 humans ranges from 124-144 in Northeast to 406 in LA and 463 in MT.

From AVMA 2016 Survey
Why are there such differences?

• Human Density is one possible factor and there are ethnic differences in dog ownership (higher in white households than African-American, Latino or Asian households).

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Odds Ratio Dog Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>1.00</td>
</tr>
<tr>
<td>African-American</td>
<td>0.39</td>
</tr>
<tr>
<td>Latin</td>
<td>0.32</td>
</tr>
<tr>
<td>Asian</td>
<td>0.30</td>
</tr>
</tbody>
</table>

Dogs per 1,000 Humans against Log Human Density (AVMA, 2012)

\[ y = -69.31x + 381.03 \]

\[ R^2 = 0.4069 \]

https://doi.org/10.1371/journal.pone.0179494.
Global Dog Populations Today
Dog Populations

- Internationally, the number of dogs per 1,000 humans (not per sqkm) varies regionally over a ten-fold range & 30-fold by country.
- Muslim countries lower rates of dog ownership but unclear why Philippines & Latin America (300 dogs per 1,000 humans) so much higher than S. Asia (50-100 dogs per 1,000 humans)

Data from variety of sources
“Pet” Dogs Per 1,000 People

Mean = 110.4 pet dogs/1,000 people
N = 40 countries
2013 Euromonitor
% of street dogs varies from close to zero in N America & W Europe to over 90% in Africa.

Very basically – dog welfare organizations are seeking to move the bars on the right to be similar to the bars on the left.

Very few roaming dogs in developed countries

Data from variety of sources
Human Health Benefits and Dog Ownership
Claims of Health Benefits & Dogs

- Many publications touting benefits but sample sizes tend to be small and few long-term analyses.


- Herzog (Feb 15, 2018; Psychology Today), generally very cautious about claiming health benefits from pets, lauded a recent study indicating that PTSD sufferers may benefit from having a pet and there are other tantalizing studies.

- And a recent Swedish study (Mubanga et al, 2019. Circ. Card. Qual & Outcomes 12:e005342) reports on CV outcomes for 150,000+ plus patients - dog owners had a lower risk of death after hospitalization for myocardial Infarction (adjusted hazard ratios of 0.67 if living alone or 0.85 if living with someone) & ischemic stroke (0.73 and 0.88 respectively).
Benefits stay the same over the different Life Stages but costs go up towards the end of life – leads to reduced rate of pet ownership.
“Costs” of Dogs in Household & Community
Rabies & Dog Bites

- Rabies threat is the most obvious cost – largely eliminated in the Americas and Western Europe (and not in Australasia) but still a major problem in Africa & Asia. Estimated $ p.a. around $8 bn with $2 bn being direct costs.

- 95+% of rabies is transmitted by Dog Bites. Other common costs are Barking & Roaming Dog behaviors & other zoonoses. In Canada, more people died from dog-bite injuries (43) from 1980-2002 than died from rabies (24 1924 – 2002)! Dog bite resources in Canada a fraction of those to rabies control (Rock et al, 2017).

- We are too lax re dog aggression and could do MUCH better to protect citizens from dog bites.
Dog Bite Data

- Very different numbers obtained depending on data collection
- In USA, around 300,000 dog bites treated annually in ERs. $675m in insurance claims.
- ER numbers per 100,000 range from a low of less than 10 (Calgary) to over 1,000 in India.

<table>
<thead>
<tr>
<th>Country</th>
<th>Bites/100,000, Pub. Surveys</th>
<th>Bites/100,000 in Hosp. ERs</th>
<th>Hospitaliztns / 100,000</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>1,650</td>
<td>103.9</td>
<td>2.1</td>
<td>Holmquist &amp; Elixhauser, 2010</td>
</tr>
<tr>
<td>UK</td>
<td>1,875</td>
<td>150</td>
<td></td>
<td>Westgarth et al, 2018, &amp; Ozanne-Smith et al 2001</td>
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<tr>
<td>Nthlands</td>
<td>830</td>
<td>70</td>
<td>1.6</td>
<td>Cornelissen &amp; Hopster, 2010</td>
</tr>
<tr>
<td>Australia</td>
<td>630</td>
<td>31</td>
<td>7-13</td>
<td>McBean et al, 2007, Thompson, 1997; Bruce et al 2015</td>
</tr>
<tr>
<td>India</td>
<td>400-1,200</td>
<td></td>
<td></td>
<td>Various – Help in Suffering, AMC, J Reece</td>
</tr>
<tr>
<td>Canada</td>
<td>&lt;10</td>
<td></td>
<td></td>
<td>Calgary Animal Services</td>
</tr>
<tr>
<td>Brazil</td>
<td>83-544</td>
<td></td>
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</table>
Calgary Animal Services

- Calgary has probably the best dog management program in the world
- 90+% of dogs are licensed and owners are fined if their dog is aggressive.
- Bites treated in ERs probably around 5/100,000 per annum.
Help in Suffering has been sterilizing around 2,500 street dogs in Jaipur every year since 1995. Approx. 75% of females are sterilized (female defensive bites down) and street dog population has fallen by 50% from 1995 to 2018. (Data from J Reece, HIS)
Why Put Up With Such High Dog Bite Rates?

• Several approaches have demonstrated success
  • Calgary – Establish aggression criteria, fine owners.
  • Multnomah County, Oregon – establish aggression criteria, require owners to take appropriate measures
  • Jaipur – Sterilize street dogs, change human-dog interactions

• And yet, most municipalities in developed countries are debating BSL approaches while municipalities in developing countries continue to rely on culling.
And Other Zoonoses & Costs

- Hydatidosis
- Leishmaniasis
- Roundworms
- Dog harassment and predation on wildlife
- Roaming dog nuisance behaviors (e.g. night-time barking)
CONCLUSIONS

• Dogs provide great rewards (maybe not so much in better health but certainly in unquestioning companionship/love). Majority of world likes/loves dogs (90+% in NA & EU).

• But big differences in dog populations per human in different nations – can explain some of variation but much not yet understood.

• On “cost” side of the ledger, humans do a lousy job of attenuating the “costs” and typically opt for short-term measures that do not work.