

# Information Brief:

## Summary of Coronial Inquest findings into Thunderstorm Asthma deaths

### November 2018



#### KEY POINTS

- The deaths of 10 Victorians that occurred during the Thunderstorm Asthma (TA) epidemic on 21-22 November 2016 gave rise to an investigation by Victorian Coroner Paresa Spanos.
- The Coroner's finding is based on the coronial investigation into the death of Mr Omar Moujalled which was expedited by prior inquiries or investigations undertaken by other Victorian agencies and authorities; the level of awareness of the TA phenomenon before 21 November 2016; lessons learnt from the epidemic; and the optimal care and management of people with asthma and/or hay fever in a TA epidemic.<sup>1</sup>
- The TA epidemic occurred on Monday 21 November 2016. During that day, Melbourne city experienced peak temperatures of 35 degrees Celsius. High levels of pollen from the plains to the north and west of Melbourne and certain meteorological conditions including a cool stormy change combined to disperse microscopic pollen particles across Victoria; triggering asthma symptoms and breathing emergencies.<sup>2</sup>
- The TA epidemic was the largest recorded in the world, resulting in the highest volume of calls received by the Victorian Emergency Services Telecommunications Authority (ESTA) in its history; a total 2,232 calls over a 12 hour period, which was 73% higher than forecast.<sup>3</sup> There were also 12,272 presentations to Victorian hospitals, a 44% increase above the average for that time.<sup>4</sup> Within the Melbourne and Geelong region, there was a **672% increase in respiratory-related presentations.**<sup>5</sup>
- The Coroner's Findings noted the many reviews that have been taken by Ambulance Victoria (AV), ESTA, the Victorian Department of Health and Human Services (DHHS), and the Inspector General for Emergency management (IGEM).<sup>6</sup>
- While the Coroner's Findings did not make recommendations because a number of recommendations made by other reviews have been comprehensive, have progressed or been implemented in full, she made a number of comments.<sup>7</sup>
- These comments included that public health and safety could be improved by further research into TA, public awareness campaigns on hay fever and TA, increased uptake of asthma action plans, further education of health professionals and advice to remain indoors during TA epidemics.<sup>8</sup>
- The Coroner also recognised that AV and ESTA have developed new scripts to inform 000 callers that 'Help is being arranged' rather than 'The ambulance is on its way' in times of significant demand.<sup>9</sup> The Coroner noted that this change may not better position consumers to make informed decisions to wait for an ambulance or engage in self-help, and that this is a complex 'extant issue'.<sup>10</sup>
- Asthma Australia will continue to work alongside Victorian Health and Emergency services to improve community health literacy, daily asthma self-management, TA preparedness, and responsiveness.

## The Victorian Coronial Inquest into Thunderstorm Asthma deaths

A Coronial Inquest was conducted into the deaths of 10 Victorians arising from the TA epidemic, with findings based on the coronial inquest into the death of Mr Omar Moujalled.

The Coroner's investigation focused on the inquiries/investigations already undertaken by other Victorian agencies and authorities; the level of awareness of the Thunderstorm Asthma (TA) phenomenon before 21 November 2016 and lessons learnt since.<sup>11</sup>

The Coroner also focused on the optimal clinical management and care of people with asthma and/or hay fever generally and in advance of a TA epidemic; the ability

to predict or forewarn the public of a similar epidemic in the future and how to give such warnings; and the preparedness to respond to similar surges in demand for services by the Emergency Services Telecommunications Authority (ESTA), Ambulance Victoria (AV) and Victorian public hospital emergency departments.<sup>12</sup>

The Coroner's findings were handed down at 2pm, Friday 9 November 2018 and will be available at: <http://www.coronerscourt.vic.gov.au/home/coroners+written+findings/>

## The Thunderstorm Asthma epidemic and resulting impact

The TA epidemic occurred on Monday 21 November 2016. During that day, Melbourne city experienced peak temperatures of 35 degrees Celsius. High levels of pollen from the plains to the north and west of Melbourne and certain meteorological conditions including a cool stormy change combined to disperse microscopic pollen particles across Victoria; triggering asthma symptoms and breathing emergencies.<sup>13</sup>

Although the exact components for a TA event are not clear, it is generally understood that thunderstorms can be a trigger for asthma because of their effect on pollen grains. Usually too large to be inhaled into the lower parts of the lung, pollen ruptures after absorbing water from the storm clouds and in doing so releases multitudes of pollen starch particles, much smaller in size. These tiny particles are small enough to go deep into the lungs and can very quickly make it difficult to breathe for people sensitised to this trigger.<sup>14</sup>

ESTA had forecast an increase in calls for help from the Victorian State Emergency Services in response to a Bureau of Meteorology (BOM) weather forecast for 21 November 2018. This forecast was for high temperatures followed by a cool change with thunderstorms for 21 November

2018.<sup>15</sup> However, the likelihood of a TA epidemic was not appreciated at the time, so ESTA did not expect an increase in number of calls requesting AV attendance.<sup>16</sup> Similarly, while BOM sent an updated severe thunderstorm warning that also covered the Geelong and Melbourne regions to ESTA at 5.15pm, the warning did not refer to air quality or the possibility of a TA epidemic.<sup>17</sup>

From 5pm and over the next hour, a cold front and thunderstorm swept across Melbourne from the west which brought wind gusts of over 80km/h; which coincided with the peak time of the day when people travel home from work.

The TA epidemic resulted in the highest volume of calls received by ESTA in its history: A total 2,232 calls over a 12-hour period starting from 6pm on 21 November 2016 to the next day.<sup>18</sup> ESTA received 73% more calls requesting an emergency ambulance than forecast.<sup>19</sup> Out of the 814 ambulance cases issued in the six hours from 6pm on 21 November 2016, 643 were for Code 1 events.<sup>20</sup> While AV's performance target is for 85% of ambulances to arrive at Code 1 events within 15 minutes, on 21 November 2016 only 57% was achieved due to unprecedented demand; although this rate improved to 71% on 22 November 2016.<sup>21</sup>

The TA epidemic that occurred on 21 November 2016 led to over 12,000 presentations to Victorian public hospital Emergency Departments (or 44% more than expected, based on a three-year average).<sup>22</sup> Emergency Departments in Melbourne and Geelong alone received almost 10,000 presentations or 58% more than expected based on the

three-year average, seeing an almost 700% increase in respiratory related presentations in the 30 hours from 6pm on 21 November 2016.<sup>23</sup>

This TA epidemic was the largest reported in the world in terms of the number of people impacted and number of deaths.<sup>24</sup>

## The Coronial Inquest Findings

Ten Victorians tragically lost their lives from this Thunderstorm Asthma epidemic; their ages ranged between 18 and 57.<sup>25</sup>

The Coroner observed the following characteristics shared by the people who died:

- Relatively young in age;<sup>26</sup>
  - Disproportionately highly represented by males;<sup>27</sup>
  - Largely of Asian backgrounds, including those who immigrated to Australia;<sup>28</sup>
  - All suffered from asthma, as well as hay fever and/or seasonal exacerbations of asthma;<sup>29</sup>
  - All were sensitive or allergic to ryegrass pollen and had suboptimal use of preventer medications to control their asthma;<sup>30</sup> and
  - Three of the people who died had Asthma Action Plans, which mirrored the proportion of Victorians with asthma in the community who also have such plans (26.9%).<sup>31</sup>
  - The Coroner's Findings drew from and referred to the many reviews that have been taken to date by AV, ESTA, the Victorian Department of Health and Human Services (DHHS), and the Inspector General for Emergency management (IGEM):<sup>32</sup>
- 'Emergency Services Telecommunications Authority – Thunderstorm Asthma – Post Incident Review' (January 2017);
  - 'The Ambulance Victoria Debrief and Review Final Report Thunderstorm Asthma – November 2016' (August 2017);
  - Chief Health Officer's Report, 'The November 2016 Victorian epidemic thunderstorm asthma event: an assessment of the health impacts' (April 2017)
  - 'Review of response to the thunderstorm asthma event of 21-22 November 2016 – Final Report' (published 2017);
  - 'The management of call-taking and dispatch for eight deceased patients during the thunderstorm asthma event of 21-22 November 2016 Investigation Report' (July 2017);
  - 'Progress Report – Implementation of recommendations from the Review of response to the thunderstorm asthma event of 21-22 November 2016' (July 2018)

The Coroner acknowledged that many recommendations made to date have already been implemented by Victorian agencies as a result of Thunderstorm Asthma epidemic.<sup>33</sup> Some of these are outlined in the following table.

Agency/Department	Changes made as a result of the thunderstorm asthma epidemic
Ambulance Victoria (AV)	Improved and created scripts to better enable callers to make informed decisions about their emergency during high demand, 'surge' periods <sup>34</sup>
	Developed a dedicated TA sub-plan to the Emergency Response Plan <sup>35</sup>
	Improved referral service to better free up ambulance resources <sup>36</sup>
	Reducing radio congestion via roll out of digital radio <sup>37</sup>
Emergency Services Telecommunications Authority	Clarified Critical Incident Response Plan to allow for escalation of functions to include not only TA but any events that cause surges in demand even if they do not fall within existing categories <sup>38</sup>
	Improved 'Whispir' text communications with staff to ensure more staff respond to overtime requests and development of 'Whispir' application <sup>39</sup>
	Refined anticipated demand for ESTA staff to include TA epidemics <sup>40</sup>
	Created pollen level monitoring <sup>41</sup>
Victorian Department of Health & Human Services	Developed risk system and provided risk levels for TA at low, moderate and high to AV <sup>42</sup>
	Implementation of enhanced epidemic TA forecasting system that enables DHHS to provide advice to health and emergency services and community about possible TA epidemics <sup>43</sup>
	Revised State Health Emergency Response Plan <sup>44</sup>
	Established single point of contact for each hospital <sup>45</sup>
	Developed private hospital protocol to enable emergency treatment of public patients <sup>46</sup>
	Improved coordination of information/warnings through development of Community Pharmacies Liaison Protocol and Primary Health Liaison Officer Protocol <sup>47</sup>
	Developed Emergency Department checklist for self-assessment of preparedness for TA epidemics <sup>48</sup>
	Implemented Real-time Health Emergency Management Systems for early notification of potential public health emergencies to DHH <sup>49</sup>
Victorian Department of Health & Human Services	Implemented Code Brown guideline for health services to remind hospitals to notify DHSS of such epidemics <sup>50</sup>
	Expanded pollen monitoring system via five new sites <sup>51</sup>
	Introduced a public health campaign, health professional training, face to face sessions for and updating modules of training for schools and child care workers, sports and recreation groups and workplaces <sup>52</sup>
Bureau of Meteorology	Conducted a workshop evaluating 2017 TA forecasting. <sup>53</sup> Recommendations arising from the workshop include working towards routine monitoring of pollen concentrations; developing automated pollen monitoring and a software platform and online portal to analyse pollen data; and gaining better understanding of weather and pollen conditions responsible for TA epidemic epidemics. <sup>54</sup>

## The Coroner's Conclusions

- The Coroner arrived at a number of conclusions which are summarised below.
- While TA has been referred to in the literature since 1980s, potential for epidemic impacts were not appreciated by emergency services and public health system.
- The TA epidemic of 21-22 November 2016 was unprecedented globally, in terms of demand on emergency services and public health system and the nature and extent of impact on individuals.
- It was important to acknowledge the work of all emergency services and health care staff who went above and beyond to assist the public in extremely challenging circumstances.
- ESTA, AV and DHHS have appropriately reflected and reviewed their performance and coordinated with the IGEM review and the coronial investigation.
- Improvements have resulted from these reviews which should mean that Victoria is better prepared for any future TA epidemics and surges in demand for emergency services more generally.

## The Coroner's Comments

The Coroner's report made seven comments on matters relating to public health and safety:

1. While no recommendations were made because many other reviews have made, progressed and implemented recommendations, there is nonetheless potential for further improve public health and safety.<sup>55</sup>
2. Further research to improve understanding of TA and ability to predict potential future epidemics is desirable, as well as further development and refinement of public warnings and TA forecasting systems.<sup>56</sup>
3. Public awareness campaigns promoting the link between hay fever and TA, encouraging preventative therapies for those at risk and the importance of asthma action plans would improve the community's health literacy and reduce future demand on emergency services.<sup>57</sup>
4. Medical, allied health and community education to encourage people with hay fever to have allergy tests and where appropriate specific management plans should be considered.<sup>58</sup>
5. When TA warnings are issued, those at risk are advised to remain indoors with windows and doors shut and/or commute to and from work later to minimise exposure.<sup>59</sup>
6. It is recognised that AV and ESTA are attempting to develop new scripts that inform 000 callers that emergency services are experiencing high demand and that callers should consider other ways to access treatment.<sup>60</sup>
7. There is an ongoing challenge to improve such scripts to enable callers to make an informed choice about whether to wait for an ambulance or other avenues to receive emergency health care.<sup>61</sup>

## Other considerations – individual and community asthma management

While the Coroner extensively considered emergency services and Victorian public hospitals' response to the TA epidemic of 21-22 November 2016, she also pointed out that:

*In order to understand the significance of those features shared by the cohort of deceased, there is a need to understand ... the asthma disease process and its recommended (or optimal) clinical management". (original emphasis) <sup>62</sup>*

In this discussion, the Coroner's report made a number of references to asthma suggesting that there were considerable gaps that needed to be addressed in improving individuals' asthma self-management but also resilience in response to a TA epidemic:

- Reliever medications (beta-2 agonist) is a "useful ... cornerstone of treatment for patients with mild asthma";<sup>63</sup> however, this is not the case for people with moderate or severe asthma.
- Using reliever medication more than twice weekly (except in exercise-induced asthma) suggested the person needed preventer medication instead.<sup>64</sup>
- Preventers "are one of the few effective treatments for moderate and severe asthma and are highly recommended as a preventative strategy for all but the mildest forms of asthma".<sup>65</sup>
- Patient non-compliance with taking preventer medications was a problem that needed "further patient education, improved health literacy and marketing to improve patient outcomes ... especially for those with moderate to severe asthma".<sup>66</sup>
- People with asthma who are required to use preventer but instead solely rely on relievers such as Ventolin "are at a greater risk" in a TA epidemic.<sup>67</sup>
- People with hay fever or have seasonal asthma exacerbations should consider using preventer medications episodically; and prevention strategies to encourage this in Melbourne should be considered.<sup>68</sup>
- Asthma Action Plans would help people identify when their condition is deteriorating, the need to call for emergency assistance and how to respond as well; although the 30% adoption rate amongst those who died was also reflected in the community.<sup>69</sup>
- It was unclear "whether any of the deceased ... resorted to the 'four by four by four' asthma first aid paradigm recommended by Asthma Australia".<sup>70</sup>
- There was no use of lung function tests taken by those who died; which is a useful way to measure the severity of an individuals' asthma.<sup>71</sup>
- An additional co-factor to TA in addition to pollen may be *Alternaria* mould; sensitivity to which can be an indicator for severe asthma.<sup>72</sup>
- Cases of severe allergic asthma with an allergen-induced exacerbation are very serious, arriving in hospital does not guarantee survival.<sup>73</sup>

## Asthma Australia's role in supporting better asthma management and care

Asthma Australia works to raise awareness and deliver evidence-based preventative health strategies through its information provision, telephone helpline and asthma referral and coaching service. This support is provided to people with asthma and their carers, as well as the community and health professionals.

In response to the 2016 TA epidemic, Asthma Australia undertook significant work alongside the Victorian

Government to improve awareness of asthma in Victoria. The outcomes of the program showed positive results with 91% of participants confirming they had an excellent understanding or confidence in managing their asthma.

More information about managing asthma during a thunderstorm asthma epidemic can be found at <https://www.asthmaaustralia.org.au/sa/about-asthma/manage-your-asthma/triggers/epidemic-thunderstorm-asthma>.



**Asthma**  
Australia



## About Asthma Australia

---

Asthma Australia supports the one in nine Australians with asthma to breathe better. Our vision is a community free from Asthma.

For over 50 years Asthma Australia and the Asthma Foundations have been leaders in asthma health care, education, research and advocacy.

Asthma Australia delivers evidence-based preventative health strategies through our information provision, telephone helpline and asthma referral and coaching service.

The organisation also provides education and training to promote best practice asthma care and first aid training to schools, childcare centres, workplaces and sporting and

To find out more about our work visit

[www.asthmaaustralia.org.au](http://www.asthmaaustralia.org.au)

For more information about this overview please contact:

**Anthony Flynn**

**Senior Manager for Research  
Policy and Advocacy**

**e: [aflynn@asthma.org.au](mailto:aflynn@asthma.org.au)**

**p: 03 9086 7860**

recreational settings to ensure asthma emergencies are addressed swiftly and appropriately.

Asthma Australia supports research that contributes to national and international understandings of asthma and how best to manage the disease.

The organisation engages in advocacy on the issues that are important to people with asthma, to ensure policies are in place to support people with asthma achieve optimal health.

Through this work, we reach more than 500,000 Australians each year.

# Information Brief: Summary of Coronial Inquest findings into Thunderstorm Asthma deaths – November 2018

## References

---

1. Victorian Coroner, 'Finding into Death with Inquest for Omar Jamil Moujalled', Court Reference COR 2016 5533, Delivered on 9 November 2018, Para 69, page 18. Note all references hereafter refers to the Finding report.
2. Para 6, page 4
3. Para 14, page 6
4. Para 125, page 33
5. Para 125, page 34
6. Para 28, Page 10-11; para 101, page 27; para 123, page 33; para 144, pages 39-40
7. Comment 1, page 55
8. Comments 2 – 5, pages 55-56
9. Comment 6, page 56
10. Comment 7, page 57
11. Para 69, page 18
12. As above
13. Para 6, page 4
14. Para 12, page 5
15. Para 7, page 4
16. Para 8, page 4-5
17. Para 11, page 5
18. Para 14, page 6
19. Para 124, page 33
20. As above
21. Para 111, page 30
22. Para 125, page 33
23. Para 125, pages 33-34
24. Paras 153-157, pages 42-44
25. Para 3, pages 3-4
26. Para 170, page 47
27. As above
28. As above
29. Para 171, page 47
30. As above
31. Para 171, 172, page 47; Australian Government Productivity Commission (AGPC) 2018, Report on Government Services. Accessed online: <https://www.pc.gov.au/research/ongoing/report-on-government-services/2018/health/primary-and-community-health>
32. Para 28, pages 10-11; para 101, page 27; para 123 page 33; para 144, pages 39-40
33. Para 104 page 28; para 151, page 42; Comment 1, page 55
34. Para 119, page 32
35. Para 113, page 30
36. Para 118, pages 31-32
37. Para 117, page 31
38. Para 91, page 25
39. Paras 95-96, page 26
40. Para 97, page 26
41. Para 100, page 27
42. Para 113, page 30
43. Para 131, page 36
44. Para 131, page 35
45. As above
46. As above
47. As above
48. As above
49. Para 131, pages 35-36
50. Para 131, page 36
51. As above
52. Para 131, page 36
53. Para 193, page 53
54. As above
55. Page 55
56. Page 55-56
57. Page 56
58. As above
62. Para 160, page 44
63. Para 161, page 44-45
64. Para 161, page 45
65. Para 162, page 45
66. Para 163, page 45
67. Para 164, page 45
68. Para 166, page 46
69. Para 167, page 46
70. Para 168, page 46
71. Para 173, page 48
72. Para 175, page 48
73. Para 178, page 49-50
59. As previous
60. As above
61. As above