<table>
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<th>1st author; location; years when asthma deaths were studied</th>
<th>Type of study; number of asthma deaths confirmed on review/number of deaths certified on MCCD (% correct)</th>
<th>Ages (years)</th>
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</table>
| MacDonald; Cardiff, UK; 1963–1974 (1)                       | Record review; 50 deaths in hospital                                                                                 | 10–82        | • Patient and doctor underestimated severity of attack  
• Inadequate past assessment of asthma  
• Physiological measurements rarely made  
• Unidentified risk status  
• Underuse of steroids | On admission most patients were severely ill  
One-third died within 24 hours |
| MacDonald; Cardiff, UK; 1963–1974 (2)                       | Record review; 90 deaths in community                                                                               | 9–76         | • Patient and doctor underestimated severity of attack  
• Inadequate past assessment of asthma  
• Unidentified risk status  
• Underuse of steroids  
• Those especially at risk if recently discharged after an attack | The fatal attack was typically short and most likely to occur in patients with a long history of asthma  
Deaths often before effective medical help |
| Cochrane; London, UK; 1971 (3)                              | Record review; 19 of 39 asthma deaths investigated                                                                 | 35–64        | • Insufficient treatment  
• No physiological assessment of airflow obstruction was made in over half of the patients | |
<p>| Foucard; Sweden; 1952–1972 compared with 1973–88 (4)       | Hospital record review                                                                                               | 1–24         | • Increasing mortality from less severe asthma not treated with anti-inflammatory drugs | In younger children, asthma was more severe, and no difference was found between the two periods of the study |</p>
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| BTA; West Midlands & Mersey, UK; 1979 (5) | Confidential enquiry, record review and questionnaire interview with the GP and a relative; 90/147 (61%) asthma deaths confirmed | 15–64 | - Most had suffered severe attacks previously  
- Avoidable factors in 77%  
- Failure to recognise severity by patients, relatives and doctor  
- Adherence satisfactory in only 42/90  
- Final attack delays  
- Inadequate past therapy  
- Inadequate past assessment of asthma  
- Unidentified risk status  
- Underuse of steroids  
- 77 community and 23 hospital deaths |
| Campbell; South Australia; 1979–1988 (6) | Case–control; NFA 154, fatal 80; record review, interviews with GP and families | Mean: NFA 52; fatal 36 | - Near-fatal asthma (NFA) more likely in younger males without comorbidities - where fatal attacks were deemed preventable.  
- NFA less likely to have delays in receiving treatment and had better access to care |
| Sears; New Zealand; 1981–83 (7) | National record review of all deaths; <70s: interviews of family, friends, and GP; 493 cases notified (in 2 years); 58/150 (39%) >70s and 271/342 (79%) <70s confirmed asthma deaths | All | - Failure to recognise severity by patients, relatives and doctor  
- Inadequate past therapy  
- Inadequate past assessment of asthma  
- Failure of the family to call for help when required  
- Delays and inadequate responses of medical services  
- Most childhood deaths from asthma should be prevented by increased family awareness, better assessment of severity, improved long-term treatment, and rapid access to emergency medical care  
- Accuracy of certification: 100% in those <35 years; accuracy across all age groups =74.6%  
- Only 6% had not required emergency treatment in the year before death |
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<tr>
<td>Fletcher; north England, UK; 1970–1985 (8)</td>
<td>Confidential Enquiry; 44 deaths notified; 35 cases investigated in detail  &lt;br&gt; 80% were preventable  &lt;br&gt; Inadequate past assessment  &lt;br&gt; Unidentified risk status in 50%  &lt;br&gt; Inadequate past therapy  &lt;br&gt; Delays in seeking help in final attack  &lt;br&gt; Inappropriate response by clinician  &lt;br&gt; Poor treatment in final attack  &lt;br&gt; 28/44 (64%) died at weekend</td>
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<td>Robertson; Melbourne, Australia; 1986–1989 (9)</td>
<td>Interviewer-administered questionnaire; 51 deaths  &lt;br&gt; Majority not classifiable as high risk (33% mild, 32% no previous admissions)  &lt;br&gt; Inadequate past assessment and therapy  &lt;br&gt; Poor adherence to advice (patients)  &lt;br&gt; Delays in seeking help</td>
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<td>Mohan; east of England, UK; 1992–1994 (10)</td>
<td>Confidential Enquiry, record review, GP and patient interviews; 36/50 (72%) confirmed asthma deaths  &lt;br&gt; &lt;65 (2 children &lt;20)  &lt;br&gt; Avoidable factors in 80%  &lt;br&gt; 59% of fatal attacks occurred in people with poorly controlled asthma  &lt;br&gt; Inadequate past routine management, assessment and therapy  &lt;br&gt; Inadequate objective monitoring  &lt;br&gt; Underuse of steroids  &lt;br&gt; No patient education in 30%  &lt;br&gt; No follow-up of non-attenders 20%  &lt;br&gt; Relatives failed to respond appropriately 20%</td>
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<tr>
<td>Study Location</td>
<td>Study Design and Details</td>
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| Bucknall; Scotland, UK; 1994–1996 (11) | Confidential review of records and interviews; 95/235 (40%) confirmed asthma deaths | All ages (65 aged 15–64) | - Some improvements compared with BTA study (5)  
- Inappropriate/inadequate past management  
- Lack of objective measurement of respiratory function  
- No follow-up after hospital discharge  
- Unsatisfactory management of the final attack  
- Failure to recognise risk status  
- Poor asthma control (53%)  
- Too much left to the patient’s own discretion  
- Failure to recognise poor adherence (not picking up prescriptions; excessive bronchodilators)  
- Inadequate inhaled steroids  
- Frequent oral steroids despite inadequate inhaled steroids  
- Failure to continue oral steroids after hospital discharge in one case previously on long-term steroids  
- Delay obtaining help |
| Bergström, Sweden, 1994–2003 (12) | Medical records and autopsy reports were assessed and telephone interviews with next-of-kin performed: 37/75 (49%) confirmed asthma deaths | 1–34; (12 children <19) | - 27% of deaths in people with mild asthma  
- Inadequate past therapy  
- Unidentified risk status (food allergy in 30%)  
- Patients delayed seeking help  
- 11% occurred following hospital discharge (two cases discharged on inadequate treatment)  
- Patient factors in 62%: non-compliance, psychosocial factors including alcohol and drug misuse |
|                        |                                                                                          |                     | - One patient told to discontinue treatment as she was pregnant  
- Two people were discharged home from hospital without adequate treatment |
<table>
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<th>Age of Death</th>
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| Jaludin; New Zealand; 1993–1995 (13) | Case–control study; structured telephone survey: 67/157 (43%) confirmed asthma deaths. 42 investigated compared with 132 random asthma sample in community and 89 hospital controls – post-admission for asthma | 10–59 | Risk factors – increased risk of asthma death due to:  
- Severity of asthma  
- Increased health service utilisation  
- Suboptimal asthma self-management |
| Burr; Wales, UK; 1994–1996 (14) | Confidential Enquiry; record review and family interviews; 52/80 (65%) asthma deaths confirmed | <65 (2 children <15) | Patient factors in (60%)  
- Severity was a major factor  
- Inadequate past therapy in 29% of cases |
| Sturdy; England, Scotland, Wales, UK; 1994–1998 (15) | Case–control study: 681 subjects with asthma in Part I on the death certificates. 532 hospital controls from primary care records | <65 | Risk factors for asthma death:  
- Fewer general practice contacts in the previous year  
- More home visits in the previous year  
- Fewer peak expiratory flow recordings in the previous 3 months |
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<th>Findings</th>
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| Harrison, England, 2001–2003 (16) | Confidential review of case notes; 95 certified cases reviewed, 57 confirmed asthma deaths | <65 | - 80% not sudden – may have been prevented  
- Monthly deaths peaked in August  
- Poor adherence  
- Poor diagnosis  
- Inadequate routine management  
- Inadequate past assessment  
- Failure to recognise risk status  
- Underuse of steroids  
- Underestimated severity of attack |
| Anagnostou, UK Eastern Region, 2001–2003 (17) | Observational case–record analysis: 20 deaths | 8–17 | - 45% had mild to moderate asthma  
- Poor patient adherence to advice  
- Unidentified risk status  
- Inadequate past assessment and therapy  
- Poorly controlled  
- Half of the severe cases managed in primary care alone  
- Many referrals delayed / not considered  
- One child with severe asthma was referred and not seen by specialist  
- Underestimated severity of attack |
Bibliography


