Improving Asthma Emergency Department Discharge Processes to Reduce Hospital Readmission Rates
Improving Asthma Emergency Department Discharge Processes
to Reduce Hospital Readmission Rates

An initiative of Asthma Foundation Queensland and New South Wales and the Statewide Respiratory Clinical Network Asthma Working Group
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## Table of Contents

Table of Contents .................................................................................................................. ii

1. Introduction .......................................................................................................................... 1

   1.1 Project background ............................................................................................................. 1

   1.2 Project Aim ......................................................................................................................... 1

   1.3 Project Objectives .............................................................................................................. 1

       1.3.1 To improve asthma level of control by at least three points within five weeks of discharge from emergency department ................................................................. 1

       1.3.2 To enhance patient self-management practices specifically correct delivery device technique and use of spacer where appropriate .......................................................... 2

       1.3.3 To encourage timely follow-up with GP for ongoing asthma review and management ............................................................................................................................ 2

   1.4 Refinements to original project design ............................................................................. 2

2. Project Method ...................................................................................................................... 2


   2.2 Project implementation (July 2015 – April 2016) ........................................................... 3

   2.3 Data analysis and report writing (May – July 2016) ......................................................... 4

3. Project Results ...................................................................................................................... 6

   3.1 Participant demographics ................................................................................................. 6

   3.2 Delivery of the intervention ............................................................................................. 6

   3.3 Objective: To improve asthma level of control by at least three points within five weeks of discharge from emergency department .............................................................................. 6

   3.4 Objective: To enhance patient self-management practices specifically correct delivery device technique and use of spacer where appropriate .......................................................................................................................... 7

   3.5 Objective: To encourage timely follow-up with GP for ongoing asthma review and management ............................................................................................................................ 9

   3.6 Interesting data not directly related to achievement of project objectives ................. 9

       3.6.1 Disagreement between perceived control and Asthma Control Score at five weeks 9

       3.6.2 Correlates of control at 5 weeks ................................................................................... 9

       3.6.3 Influenza as trigger factor .......................................................................................... 10

   3.7 Economic analysis ............................................................................................................ 10

       3.7.1 Cost of the Asthma Discharge Protocol Intervention ................................................ 10

       3.7.2 Cost-effectiveness of the Asthma Discharge Protocol Intervention ...................... 10

4. Discussion ............................................................................................................................. 11

   4.1 To improve asthma level of control by at least three points within five weeks of discharge from emergency department ................................................................................. 11

   4.2 To enhance patient self-management practices specifically correct delivery device technique and use of spacer where appropriate .......................................................... 12

   4.3 To encourage timely follow-up with GP for ongoing asthma review and management. 13
5.0 Limitations.........................................................................................................................13
6.0 Conclusion..........................................................................................................................14
7.0 Recommendations ..............................................................................................................15
References ...................................................................................................................................16
Appendix A – Robina Information sheet..................................................................................18
Appendix B – Robina Consent form .........................................................................................19
Appendix C – GCUH information sheet ....................................................................................20
Appendix D – GCUH Consent form .........................................................................................21
Appendix E – Interim asthma action plan ..................................................................................22
Appendix F – GP letter................................................................................................................23
Executive Summary

Repeated asthma related presentations to emergency departments are associated with an increased risk of life-threatening asthma. However, Australians are increasingly using hospitals to manage asthma flare-ups that may otherwise have been prevented through engaging with their General Practitioner in pro-active and planned care.

In response to the increasing rate of repeated asthma related emergency department presentations, members of the Statewide Respiratory Clinical Network Asthma Working Group and Asthma Foundation Queensland and New South Wales (Asthma Foundation) developed and trialled a strategy to formalise discharge processes with the aim of reducing repeated emergency department presentations.

The Asthma Emergency Department Discharge Protocol involved the provision of comprehensive education to the patient at discharge in addition to a spacer, interim asthma action plan, written prompt to see their General Practitioner and an Asthma Control Pack. Patients were also referred to Asthma Foundation’s 1800 ASTHMA Helpline for two education sessions via telephone over a five week period. The protocol was implemented at Robina Hospital Emergency Department from July – December 2015 with Gold Coast University Hospital serving as a comparison site.

Patients enrolled via Gold Coast University Hospital received usual care upon discharge, with this site acting as control until five weeks post discharge at which point patients received the reduced intervention of one follow-up telephone education session delivered by Asthma Foundation. This process ran concurrently with Robina Hospital.

Patients receiving the Asthma Emergency Department Discharge Protocol were four times more likely to be well controlled and significantly more likely than the control cohort to use their delivery device correctly at five weeks post discharge, with the intervention costed at $282 per person with improved asthma control. When valued according to standard Australian Government rates, the intervention delivered an economic benefit of $1834 for every patient enrolled in the project.

It is acknowledged that comprehensive education at the time of hospital discharge is a resource intensive activity and open to the fragilities of a busy health care system. However, the outcomes from the Gold Coast University Hospital highlight the potential of brief education at discharge (focusing on delivery device technique and provision of a spacer) and referral of patients to Asthma Foundation for telephone education follow-up. When provided with just one telephone education session at five weeks post discharge, patients performed on par with the intervention cohort when examined at four months across a range of key measures including level of asthma control, accuracy of delivery device technique, use of a spacer and continued use of preventer medication.

In summary, it is evident that a multi-pronged approach of comprehensive education and resourcing upon discharge followed by Asthma Foundation provided education at one and five weeks post discharge results in significant, rapid and sustained improvement in two key areas – level of asthma control and accuracy of delivery device usage. Whilst an effective approach, this is the more costly of the two options, costed at $96 per patient. Initiatives that enable the discharging hospital to deliver a targeted, brief educational intervention (particularly focused on delivery device technique) in a cost effective manner, followed by one telephone education session delivered by Asthma Foundation shows promise in regaining asthma control in a less costly manner (costed at $28 per patient), albeit over a longer period of time.
The challenge with asthma management remains peoples’ long term asthma self-management behaviours including continued preventer use, accuracy of delivery device technique and ensuring an ongoing relationship with their general practitioner. Whilst implementation of the Asthma Emergency Department Discharge Protocol contributed to rapid improvements in level of asthma control, understanding of asthma specific discharge planning could be further enhanced by prolonged studies that examine if appropriate self-management behaviours are maintained for the longer term in response to this initiative. This will enable a review of the impact of this intervention on hospital re-presentation rates and ultimately on other longer term asthma related health outcomes.
1. Introduction

1.1 Project background

Repeated asthma related emergency department presentations are a key factor associated with an increased risk of life-threatening asthma. Acute exacerbations of severe asthma are mostly preventable with appropriate treatment. However, asthma is one of the most common reasons people seek acute care, both at hospital and general practice.¹

People presenting to an emergency department have a high personal health risk, with many experiencing previous and subsequent admissions to hospital. The Australian Asthma Handbook² identifies three or more emergency department visits in the past year or two or more hospitalisations in the past year as increasing the risk of life-threatening asthma. Yet, 62% of children and 40% of adults will re-present to an emergency department within one year of initial presentation with acute asthma.³

The Australian Asthma Handbook² recommends that all patients treated in acute care services receive advice prompting them to visit their usual general practitioner (GP) within two to four weeks of leaving hospital, or earlier if necessary. However, rates of follow-up with the GP or primary care physician after presentation for acute asthma are best defined as limited with estimates, in the paediatric setting, around 44.5%⁴ with the follow-up rate of adults anticipated to be lower.

The Handbook² also recommends that acute care doctors provide patients with an interim asthma action plan and prompt them to visit their GP for an updated plan. However, with only one-quarter of people with asthma thought to possess an asthma action plan⁵, there is significant room for improvement.

Based on the evidence outlined above, the Queensland Government’s Statewide Respiratory Clinical Network’s Asthma Working Group identified formalising emergency department discharge processes as a priority in 2012. The originally-proposed emergency department discharge protocol was developed in partnership with expert clinicians from West Moreton Hospital and Health Service, Gold Coast Hospital and Health Service, Asthma Foundation Queensland and members of the Asthma Working Group. The Asthma Emergency Department Discharge Protocol was developed following an earlier focus on the production of resources to support people in managing their asthma, namely the Asthma Control Pack, which is a component of the discharge protocol.

Robina and Gold Coast University Hospitals (GCUH) were selected as the trial hospitals with Robina acting as intervention and GCUH acting as control.

1.2 Project Aim

To reduce short-term asthma related re-presentations to emergency departments through the implementation of a hospital based discharge protocol.

1.3 Project Objectives

1.3.1 To improve asthma level of control by at least three points within five weeks of discharge from emergency department.

The achievement of this objective is measured by the following key performance indicators:

a) Proportion of patients with an increase in Asthma Control Score of three or greater from one week to five weeks
b) Proportion of patients with an Asthma Control Score of 20 or more at five weeks and four months post discharge

1.3.2 To enhance patient self-management practices specifically correct delivery device technique and use of spacer where appropriate.

The achievement of this objective is measured by the following key performance indicators:

a) Delivery device technique accuracy at intervention and control sites at five weeks and four months post intervention

b) Improvement in delivery device technique accuracy at intervention site from one week to five weeks post intervention

c) Spacer usage at intervention and control sites at five weeks

d) Improvement in spacer usage at intervention site from one week to five weeks post intervention

e) Long term spacer use measured at four months

f) Proportion of patients continuing preventer use at four months post intervention

1.3.3 To encourage timely follow-up with GP for ongoing asthma review and management.

The achievement of this objective is measured by the following key performance indicators:

a) Proportion of patients who visited GP by five weeks post discharge

b) Proportion of patients who had seen GP post hospital visit and received an asthma action plan.

1.4 Refinements to original project design

The project had originally identified re-presentations to emergency department within the three month trial period as the key marker to determine the effectiveness of the emergency department discharge protocol. However, due to lower than anticipated recruitment and the resulting lack of specificity this measure would provide, the project was adjusted to include an additional phone call at four months post discharge to measure level of asthma control. Hospital re-presentation was still measured at four months post discharge however the numbers are insufficient to attribute value and therefore have not been reported here.

Difficulty in recruiting sufficient patient numbers from the Gold Coast University Hospital resulted in the project recruitment and implementation extending beyond the originally proposed three month period, to a total of six months. The method of recruiting via GCUH was modified from the originally proposed prospective recruitment to a process of retrospective recruitment. Patients who had presented to GCUH were phoned following discharge and permission sought to enrol them in the study.

2. Project Method

The implementation of this project occurred in three distinct phases:

1. Strategy development

2. Project implementation and

Three months was initially proposed for this phase. However, external factors caused unexpected delays, resulting in a six month strategy development phase. This phase comprised the following key activities:

- Sourcing of support from emergency department medical and nursing staff and associated training of staff in project requirements
- Development and design of project resources including patient information sheet, consent form, GP notification letter and interim Asthma Action Plan
- Submission of ethics and site specific approval processes and
- Design of data collection tool.

2.2 Project implementation (July 2015 – April 2016)

There were two stages to the project’s implementation phase:

a) Patient recruitment and ongoing patient contact

b) Follow-up data collection

Patient recruitment commenced in July 2015. Difficulty in recruiting sufficient patients, particularly by the control cohort resulted in extending the originally proposed three month recruitment period to six months, ending in Dec 2015.

The following table outlines the project strategy as implemented at the intervention and control sites across the four month project period. It should be noted that GCUH remains a control site until the five week period at which point a reduced intervention is implemented with these patients.

<table>
<thead>
<tr>
<th>Intervention site (Robina Hospital)</th>
<th>Control site (GCUH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hospital identifies patient meeting project criteria:</td>
<td></td>
</tr>
<tr>
<td>- Adult 18yo and older experiencing asthma exacerbation</td>
<td></td>
</tr>
<tr>
<td>2. Hospital provides patient with information sheet (Appendix A), consents patient to project and forwards referral (Appendix B) to AFQ</td>
<td>2. Hospital provides patient with information sheet (Appendix C), consents patient to project and forwards referral (Appendix D) to AFQ</td>
</tr>
<tr>
<td>3. Hospital provides patient with:</td>
<td></td>
</tr>
<tr>
<td>- Asthma education</td>
<td></td>
</tr>
<tr>
<td>- Spacer</td>
<td></td>
</tr>
<tr>
<td>- Interim asthma action plan (Appendix E)</td>
<td></td>
</tr>
<tr>
<td>- Letter to prompt GP visit (Appendix F)</td>
<td></td>
</tr>
<tr>
<td>- Asthma Control Pack</td>
<td></td>
</tr>
<tr>
<td>4. AFQ calls patient at one week post discharge:</td>
<td></td>
</tr>
</tbody>
</table>
- Assess if project intervention delivered as intended
- Collect Asthma Control Score
- Assess delivery device technique accuracy and if spacer is being used
- Deliver personalised education

5. AF calls patient at five weeks post discharge:
- Collect Asthma Control Score
- Assess if patient has visited GP and if asthma action plan was received
- Assess delivery device technique and confirm if spacer is being used
- Confirm if Asthma Control Pack reviewed
- Identifies education need and delivers as appropriate
- Reschedules call for four months post discharge

5. AF calls patient at five weeks post discharge:
- Collect Asthma Control Score
- Determine if hospital provided:
  - Spacer
  - Interim asthma action plan
  - Letter to prompt GP visit
  - Asthma Control Pack
- Assess delivery device technique and if spacer is being used
- Assess if patient has visited GP and if asthma action plan was received
- Identifies education need and delivers as appropriate
- Reschedules call for four months post discharge

6. AF calls patient at four months post discharge
- Assess delivery device technique and confirm if spacer is being used
- Collect Asthma Control Score
- Assess if preventer use continued
- Identifies education need and delivers as appropriate

6. AF calls patient at four months post discharge
- Assess delivery device technique and confirm if spacer is being used
- Collect Asthma Control Score
- Assess if preventer use continued
- Identifies education need and delivers as appropriate

Follow-up data collection continued until April 2016.

2.3 Data analysis and report writing (May – July 2016)

Statistical methods
Data were collected via telephone interview and entered directly into the Asthma Foundation electronic telephone database. Fields were customised where relevant to ensure accuracy in data collection. Data were imported into Excel for cleaning and then into IBM SPSS V21.0 for analysis. Logic and consistency checks were performed to ensure data quality. Descriptive and stratified analysis using Chi-squared testing or paired t-tests was undertaken to identify frequencies and associations. A logistic regression was performed to estimate the odds ratio of being well controlled at five weeks in the intervention relative to the control cohort.
Economic methods

We undertook an economic evaluation to look at the cost and cost-effectiveness of the full Asthma Emergency Department Discharge Protocol intervention. The analysis was undertaken from the perspective of the health system. The timeframe used was the duration of the trial (four months) and all costs are reported in 2015 AUD.

The cost of the intervention was estimated retrospectively based on interviews with the personnel delivering the intervention and review of project accounting records. All research and evaluation costs were excluded. Resources used in delivering the emergency department component of the intervention included 50 minutes of staff time to deliver the intervention and the consumables given to patients. Resources used in Asthma Foundation comprised staff time for phone calls. On average two attempts were required to either make full contact with participants or determine that they could not be reached for follow up. Each contact attempt was assumed to take five minutes of staff time, each full phone call was assumed to take 46 minutes, based on Asthma Foundation records. Consumables were valued at market prices based on project accounting records. All staff time was valued at base salary only. The salary for the Clinical Nurse Consultant was valued at $52.50/hour, the salary for the Asthma Foundation personnel was valued at $38/hour. We did not include institutional overheads for either the hospital or the Asthma Foundation. This intervention represented an enhancement of existing services so it was assumed that these would be minimal at the volume of patients included in the trial.

We estimated the cost-effectiveness of the intervention as the cost per patient with improved asthma control (i.e. moving from uncontrolled asthma to controlled asthma). We also conducted an analysis where we placed an economic value on the observed improvement in asthma control. We used a burden of disease approach as outlined in Vos et al 2015 to present results as the cost per disability adjusted life year (DALY) averted in our cohort due to improved asthma control. The health state of uncontrolled asthma was assigned a DALY weight of 0.132, whilst controlled asthma was assigned a DALY weight of 0.009. Each participant in our cohort controlled at five week follow up was assumed to remain controlled for three months (which is supported by our four month follow up data); therefore represents an economic benefit of 0.031 DALYs. Finally, in line with the recently released report “The Hidden Cost of Asthma” we valued DALYs averted according to the estimate of the Value of a Statistical Life Year (VSLY) provided by the Department of Prime Minister and Cabinet (2014), which was $184,730 in 2015 AUD. Therefore every participant with improved control represents an economic benefit of $5,727. This allows us to calculate the net monetary cost of our intervention as the cost of delivery minus the cost savings from improved asthma control. As such negative values for the net monetary cost represent economic benefits accruing from the intervention. Uncertainty in all data included in the economic model was captured using probabilistic sensitivity analysis. All estimates were characterised using appropriate distributions (beta for proportions, normal for time and odds ratios). Cost variables and DALY weights were considered fixed.
3. Project Results

Presented below are data related to the achievement of the project objectives as per the key performance indicators. Data from both the intervention site and control site are presented.

3.1 Participant demographics

Fifty-three patients were consented to participate in the study by Robina Hospital (intervention site), of which 29 were successfully contacted at week one, 24 at week five and 11 at four months.

Nineteen patients were consented to participate in the study by Gold Coast University Hospital (control site), of which 16 were successfully contacted at week five and 11 at four months.

Demographic characteristics for the five week cohort are as follows:

<table>
<thead>
<tr>
<th></th>
<th>Robina Hospital (int)</th>
<th>GCUH (cont)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number participants at 5wk follow up</td>
<td>24</td>
<td>16</td>
</tr>
<tr>
<td>Female (n %)</td>
<td>18 (75%)</td>
<td>14 (88%)</td>
</tr>
<tr>
<td>Average age (mean s.d.)</td>
<td>48 (15.7)</td>
<td>47 (19.6)</td>
</tr>
<tr>
<td>Influenza as trigger (n %)</td>
<td>7 (29%)</td>
<td>3 (18%)</td>
</tr>
</tbody>
</table>

3.2 Delivery of the intervention

Patient recall data suggest that the intervention was delivered as intended at Robina Hospital, with over 90% of patients in project receiving each of the five intervention components.

In contrast, standard care at GCUH meant that whilst over 80% had device technique checked and were provided with a spacer, only half were provided with an interim asthma action plan and only 13% received a letter prompting them to see their GP or received the Asthma Control Pack, as measured by patient recall.

<table>
<thead>
<tr>
<th></th>
<th>Robina Hospital (int) Patient recall at 1 wk</th>
<th>GCUH (cont) Patient recall at 5 wks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital provided GP letter</td>
<td>27/29 (93%)</td>
<td>2/16 (13%)</td>
</tr>
<tr>
<td>Hospital checked device technique</td>
<td>26/29 (90%)</td>
<td>14/16 (88%)</td>
</tr>
<tr>
<td>Hospital provided spacer</td>
<td>27/29 (93%) (2 had one prior)</td>
<td>13/16 (81%) (1 had one prior)</td>
</tr>
<tr>
<td>Hospital provided interim asthma action plan</td>
<td>27/29 (93%)</td>
<td>9/16 (56%)</td>
</tr>
<tr>
<td>Hospital provided Asthma Control Pack</td>
<td>25/29 (86%)</td>
<td>2/16 (13%)</td>
</tr>
</tbody>
</table>

3.3 Objective: To improve asthma level of control by at least three points within five weeks of discharge from emergency department.

Key performance indicators:

1. Proportion of patients with an increase in Asthma Control Score of three or greater from one week to five weeks

2. Proportion of patients with Asthma Control Score of 20 or more at five weeks and four months post discharge
The increase in Asthma Control Score between one week and five weeks for patients in the intervention arm was statistically significant. Scores increased by a mean of 10.1 points (95% CI 7.9 – 12.3) and the proportion of patients well controlled rose from 10% to 79% (p<0.001). Each participant in the intervention arm (100% of patients) experienced an increase in Asthma Control Score of three or more points from week one to week five.

At five weeks post discharge, intervention patients (who at this time had received in hospital education and one education session by Asthma Foundation) had significantly better asthma control than patients from the control arm (who had received usual hospital care only at this stage). A significantly higher number of intervention patients were well controlled (79%) as compared to control patients (19%) (p<0.001). The odds ratio for control at five weeks in the intervention relative to the control cohort is 16.5 (95% CI: 3.3 - 81.2) which represents a relative risk of being controlled at five weeks in the intervention cohort of 4.2 relative to the control cohort. The Asthma Control Score of patients in the intervention arm was a mean of 5.2 points higher than patients in the control arm (95% CI 2.3-8.0) at five weeks.

By four months, the proportion of patients with well controlled asthma were similar between the two cohorts. Intervention arm patients maintained the high proportion of well controlled results that were observed at the five week follow up. Control arm patients with well controlled asthma at four months (after receiving one educational session from Asthma Foundation) increased from 19% to 73% between the five week and four month follow ups (p=0.005), a statistically significant result.

### 3.4 Objective: To enhance patient self-management practices specifically correct delivery device technique and use of spacer where appropriate.

**Key performance indicators:**

1. Delivery device technique accuracy at intervention and control sites at five weeks and four months post intervention

2. Improvement in delivery device technique accuracy at intervention site from one week to five weeks post intervention

<table>
<thead>
<tr>
<th></th>
<th>Robina Hospital (int)</th>
<th>GCUH (cont)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma Control Score of 20 or more</td>
<td>10% (3/29)</td>
<td>79% (19/24)</td>
<td>19% (3/16)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>82% (9/11)</td>
<td>73% (8/11)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Correct delivery device technique</th>
<th>Robina Hospital (int)</th>
<th>GCUH (cont)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1wk</td>
<td>72% (21/29)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5wks</td>
<td>96% (23/24)</td>
<td>44% (7/16)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>4mo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5wks</td>
<td>91% (10/11)</td>
<td>100% (11/11)</td>
<td>1</td>
</tr>
<tr>
<td>4mo</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
At five weeks post discharge, patients attending Robina Hospital, who had received education upon discharge and one follow-up contact by Asthma Foundation, were significantly more likely to display correct delivery device technique than those at GCUH who had received usual hospital care and no follow-up by Asthma Foundation (96% compared to 44%; p<0.001). Rates of correct delivery device technique were maintained in the Robina cohort at four months post discharge, but by this point (when both groups had received educational intervention by Asthma Foundation), participants in both cohorts were equally likely to be displaying correct delivery device technique.

The intervention cohort saw a statistically significant improvement in device technique accuracy of 24 percentage points between week one (when only in hospital education had been provided) and week five (when an additional education session was provided by Asthma Foundation) increasing from 72% accuracy at week one to 96% accuracy at week five. (p=0.02)

3. Spacer usage at intervention and control sites at five weeks

4. Improvement in spacer usage at intervention site from one week to five weeks post intervention

5. Long term spacer use measured at four months

<table>
<thead>
<tr>
<th></th>
<th>Robina Hospital (int)</th>
<th>GCUH (cont)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1wk</td>
<td>Using spacer</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>93% (27/29)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5wks</td>
<td>100% (24/24)</td>
<td>94% (15/16)</td>
<td>1</td>
</tr>
<tr>
<td>4mo</td>
<td>100% (11/11)</td>
<td>91% (10/11)</td>
<td>1</td>
</tr>
</tbody>
</table>

Spacer usage across both control and intervention sites was reasonably high, with between 91% and 100% of patients using a spacer across the project timeframe. Although the use of a spacer was higher by patients in the intervention cohort at five weeks and four months, this difference was not statistically significant. Longer term spacer use was evident, with cohorts equally likely to be using a spacer at four months post discharge.

6. Proportion of patients continuing preventer use at four months post intervention.

<table>
<thead>
<tr>
<th></th>
<th>Robina Hospital (int)</th>
<th>GCUH (cont)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1wk</td>
<td>Patient using preventer at four months</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>82% (9/11)</td>
<td>91% (10/11)</td>
<td>1</td>
</tr>
</tbody>
</table>

Cohorts were equally likely to be using their preventer at four months post discharge.
3.5 Objective: To encourage timely follow-up with GP for ongoing asthma review and management.

Key performance indicator:

1. Proportion of patients who visited GP by five weeks post discharge

<table>
<thead>
<tr>
<th>Patient visited GP by five weeks</th>
<th>Robina Hospital (int)</th>
<th>GCUH (cont)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1wk</td>
<td>75% (18/24)</td>
<td>56% (9/16)</td>
<td>0.22</td>
</tr>
<tr>
<td>5wks</td>
<td>56% (9/16)</td>
<td>56% (9/16)</td>
<td></td>
</tr>
<tr>
<td>4mo</td>
<td>48% (9/18)</td>
<td>48% (9/19)</td>
<td></td>
</tr>
</tbody>
</table>

Patients from the intervention arm were more likely than control arm participants to have visited their GP within five weeks of discharge from hospital, however this difference was not statistically significant.

2. Proportion of patients who had seen GP post hospital visit and received an asthma action plan

<table>
<thead>
<tr>
<th>Proportion of patients, who had seen GP, who received asthma action plan</th>
<th>Robina Hospital (int)</th>
<th>GCUH (cont)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1wk</td>
<td>22% (4/18)</td>
<td>33% (3/9)</td>
<td>0.53</td>
</tr>
<tr>
<td>5wks</td>
<td>19% (3/16)</td>
<td>20% (2/10)</td>
<td></td>
</tr>
<tr>
<td>4mo</td>
<td>24% (6/25)</td>
<td>24% (6/25)</td>
<td></td>
</tr>
</tbody>
</table>

Of patients who had visited their GP within five weeks of discharge, only 26% overall received an updated asthma action plan. There was no significant difference between cohorts.

3.6 Interesting data not directly related to achievement of project objectives

3.6.1 Disagreement between perceived control and Asthma Control Score at five weeks

There was poor agreement between perceptions of asthma control and levels of control as measured by the Asthma Control Score. Six individuals perceived that their asthma was completely or well controlled when their asthma score was less than 20. The kappa score for agreement between the measures was 0.516 with p<0.001, indicating only moderate agreement between the two scales.

<table>
<thead>
<tr>
<th>Perceived level of control at 5weeks</th>
<th>Not controlled (score &lt;20)</th>
<th>Well controlled (score &lt;=20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completely controlled</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>Well controlled</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Somewhat controlled</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Poorly controlled</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Not controlled</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

3.6.2 Correlates of control at 5 weeks

<table>
<thead>
<tr>
<th></th>
<th>Well controlled</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEIFA in bottom 5 deciles</td>
<td>3/9 (33%)</td>
<td>0.14</td>
</tr>
<tr>
<td>SEIFA in top 5 deciles</td>
<td>19/31 (61%)</td>
<td></td>
</tr>
<tr>
<td>Hospital did not provide IAAP</td>
<td>2/8 (25%)</td>
<td>0.14</td>
</tr>
<tr>
<td>Hospital provided IAAP</td>
<td>20/32 (63%)</td>
<td></td>
</tr>
<tr>
<td>Has not seen GP at 5 weeks</td>
<td>6/13 (46%)</td>
<td>0.14</td>
</tr>
<tr>
<td>Has seen GP at 5 weeks</td>
<td>16/27 (59%)</td>
<td>0.44</td>
</tr>
</tbody>
</table>
There was some indication that participants living in a high SEIFA area (top 5 deciles) and to whom the hospital provided an interim asthma action plan were more likely to be well controlled at five weeks but these were not statistically significant. There was no relationship between visiting the GP by five weeks and being well controlled. There was no relationship between age or gender and likelihood of control.

3.6.3 Influenza as trigger factor

Patient report of a positive influenza result prompting asthma flare-up was evident with almost 30% of intervention patients reporting influenza infection as prompting their flare up and subsequent hospital presentation. The rate was lower at the control site, representing just under 20% of patients.

3.7 Economic analysis

3.7.1 Cost of the Asthma Emergency Department Discharge Protocol Intervention

The total cost of delivering the intervention was just over $5,000. This represents a cost of $96 per participant. A higher percentage of the costs (63%) were incurred at the emergency department. The majority of costs (83%) represent the opportunity cost of ED and Asthma Foundation staff time, with financial expenditure on consumables only accounting for 17% of costs.

<table>
<thead>
<tr>
<th></th>
<th>Unit Cost</th>
<th>Number units</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Emergency Department Costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost for patient consultation</td>
<td>$43.75</td>
<td>53</td>
<td>$2,318.75</td>
</tr>
<tr>
<td>Cost for spacer</td>
<td>$5.50</td>
<td>53</td>
<td>$291.50</td>
</tr>
<tr>
<td>Cost for control pack</td>
<td>$11.00</td>
<td>53</td>
<td>$583.00</td>
</tr>
<tr>
<td><strong>Total costs</strong></td>
<td></td>
<td></td>
<td><strong>$3,193.25</strong></td>
</tr>
<tr>
<td><strong>Asthma Foundation Costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost for phone attempts</td>
<td>$3.17</td>
<td>106</td>
<td>$336.02</td>
</tr>
<tr>
<td>Cost for phone calls</td>
<td>$29.13</td>
<td>53</td>
<td>$1,543.89</td>
</tr>
<tr>
<td><strong>Total costs</strong></td>
<td></td>
<td></td>
<td><strong>$1,879.91</strong></td>
</tr>
<tr>
<td><strong>OVERALL COSTS</strong></td>
<td></td>
<td></td>
<td><strong>$5,073.16</strong></td>
</tr>
</tbody>
</table>

3.7.2 Cost-effectiveness of the Asthma Emergency Department Discharge Protocol Intervention

The results of the cost-effectiveness analysis are shown below. The intervention costs $282 per participant with improved asthma control and $9,165 per DALY averted. Where DALYs are valued according to the Value of a Statistical Life Year, the intervention offers net economic benefits of $97,175 (or $1,834 per participant). Despite uncertainty in the underlying data, there is 100% confidence in the conclusion that the intervention delivers net economic benefits where DALYs are valued according to the VSLY.

<table>
<thead>
<tr>
<th></th>
<th>Baseline estimate</th>
<th>Confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention cost</td>
<td>$5,073</td>
<td>($4,489 ; $5,649)</td>
</tr>
<tr>
<td>Cost per participant</td>
<td>$96</td>
<td>($85 ; $107)</td>
</tr>
<tr>
<td>Number additional patients controlled</td>
<td>18</td>
<td>(5 ; 22)</td>
</tr>
<tr>
<td>Cost per patient controlled</td>
<td>$282</td>
<td>($219 ; $960)</td>
</tr>
<tr>
<td>Number DALYs averted</td>
<td>0.55</td>
<td>(0.15 ; 0.68)</td>
</tr>
<tr>
<td>Cost per DALY averted</td>
<td>$9,165</td>
<td>($7,121 ; $31,228)</td>
</tr>
<tr>
<td>Net economic benefits</td>
<td>$97,175</td>
<td>($23,587 ; $120,317)</td>
</tr>
<tr>
<td>Net economic benefits per participant</td>
<td>$1,834</td>
<td>($445 ; $2,270)</td>
</tr>
</tbody>
</table>
4. Discussion

This discussion addresses findings according to the program’s key objectives.

4.1 To improve asthma level of control by at least three points within five weeks of discharge from emergency department.

Asthma Control Score

The Asthma Control Test (which provides an Asthma Control Score) has been validated for use in assessing asthma control with a change of three points indicating a clinically meaningful change in asthma control in a patient over time.

At five weeks post discharge, intervention site patients (who by this time had received in-hospital education plus one Asthma Foundation education session) experienced significantly better levels of asthma control, as evidenced by an Asthma Control Score of 20 or more, than the control site (who by this time had received only usual hospital care). The intervention cohort was four times as likely to be well controlled and every intervention patient increased their Asthma Control Score by three or more points from week one to week five, a statistically meaningful change in asthma control.

The cost of delivering the intervention was just over $5,000 or $96 per participant. This represents a cost per patient with improved asthma control at five weeks of $282; or a cost of $9,165 per DALY averted. Whether this offers value for money is essentially a value judgement, dependent on how you value improvements in asthma control. However, if the cost of uncontrolled asthma is valued according to a burden of disease approach, it is likely that the benefits from improved control will outweigh the cost of this intervention, offering net economic benefits of $1,834 per participant in the intervention.

We recognise that DALYs averted does not fully capture the true economic value of improved asthma control. We were not able to measure changes in health service utilisation (hospital and GP), out-of-pocket expenditure, or productivity in people with asthma and their carers. There is good evidence that uncontrolled asthma increases rates of absenteeism and presenteeism and arguably most hospital expenditure on asthma in Australia and all asthma related deaths are related to uncontrolled asthma (with some proportion of this avoidable). As such both changes in healthcare costs (including increased use of medications and GP access) and the economic benefits from the improvements in asthma control achieved by our intervention are likely to be greater than those estimated here.

At four months post discharge (when intervention patients had received two Asthma Foundation education sessions and control patients had received one), high levels of asthma control were maintained in the intervention group. Patients from the control site (who had received one Asthma Foundation education session at five weeks) experienced a significant improvement in their level of asthma control from five weeks to four months to levels comparable to the intervention group. It is unclear to what extent this can be attributed to education provided by Asthma Foundation. However, the achieved levels of control are on par with or higher than than that seen in the general asthma population, suggesting that at least some of this effect may be due to this contact.

The cost of an intervention comprising just a single phone call from the Asthma Foundation is around $28 per referral and contact rates were comparable to the intervention arm (suggesting that it would reach a similar number of patients). Thus it would be worth exploring the impact of a reduced model of the intervention comprising the delivery of brief education by the
discharging hospital and one follow-up call by Asthma Foundation, as this may offer an even more cost-effective way of reducing the burden of uncontrolled asthma.

4.2 To enhance patient self-management practices specifically correct delivery device technique and use of spacer where appropriate.

Delivery device technique and spacer usage

Inappropriate use of asthma inhalers is an issue affecting the majority of people with asthma, with estimates that up to 90% of people with asthma do not use their inhaler correctly\textsuperscript{13}. Incorrect use of inhalers impacts significantly on asthma control resulting in increased use of asthma medications and emergency medical services\textsuperscript{14}.

There is substantial evidence that patients who receive inhaler technique education display improved inhaler technique\textsuperscript{15}. However, estimates indicate that at least one-quarter of people using an inhaler never receive technique education\textsuperscript{16} and follow-up for those that do is sorely lacking with approximately one in ten only receiving follow-up technique assessment and education\textsuperscript{17}.

The Australian Asthma Handbook\textsuperscript{2} recommends that patients treated in an acute care setting receive inhaler technique assessment and are provided with a spacer. These practices appear to be relatively standard care in the project’s control hospital, with 88% of patients having their device technique assessed and 81% receiving a spacer, comparing favourably with the intervention site with 90% of patients having device technique assessed and 93% receiving a spacer from the hospital.

The project findings suggest that in-hospital education at the time of discharge plus follow-up education on technique accuracy may well be effective in enhancing the likelihood of correct inhaler technique at five weeks. Patients who had received this multi-pronged education were twice as likely to have correct technique.

Of substantial interest is the impact of follow-up telephone assessment and education on inhaler technique accuracy. Intervention patients, who received education via phone at week one, saw a significant improvement in their technique accuracy after this phone education session, when measured again four weeks later. Control patients, who received education via phone at week five, saw a significant improvement when measured again at four months. In the absence of a control group at four months to monitor fluctuation in technique accuracy in the absence of education, we cannot definitively claim this finding as due to the intervention. However, the trend suggests a positive impact of even just one phone based assessment and education session on improving device technique accuracy.

At five weeks, spacer usage was high across both cohorts, suggesting this may be due to provision of a spacer by the discharging hospital under usual care. A pattern of long term spacer usage is evident with both cohorts retaining high usage rates at four months.

Ongoing preventer use

Management guidelines indicate that most adults with asthma benefit from regular inhaled corticosteroid treatment\textsuperscript{2}. Recent estimates of the numbers of people prescribed preventer inhalers in 2013 suggests that two-thirds were likely to be using them infrequently\textsuperscript{18}. Whilst this research project did not follow patients for a sufficiently lengthy period of time to ascertain long term preventer use, initial indications are positive with 86% of patients across both cohorts still taking their prescribed preventer at four months post discharge. Whether this is attributable to the project intervention cannot be fully ascertained. However, the rate of
preventer use in each cohort compares favourably with the general population\textsuperscript{18} and may result from the project intervention.

4.3 To encourage timely follow-up with GP for ongoing asthma review and management.

Follow up with GP

National management guidelines recommend that patients be prompted to return to their GP within two – four weeks of discharge from hospital\textsuperscript{2}. However, in Australia, many people with asthma are not under regular care by a GP. A review of general practice consultations in Australia found only a little over half of 396 patients with asthma who had visited their GP in the last 12 months had asthma managed during at least one of these visits\textsuperscript{19}.

This project has highlighted that a prompt to visit the GP, delivered by the discharging intervention hospital and reinforced by follow-up education by Asthma Foundation potentially encouraged three quarters of patients to visit their GP within five weeks of discharge. Comparatively, only a little over half (56\%) of control patients visited their GP within five weeks of discharge. Whilst these differences are not significant, a theme is evident that a repeated prompt to visit the GP, post-acute care, may result in higher attendance rates.

Asthma action plan provision by hospital and GP

Guidelines suggest that patients treated in a hospital should receive an interim asthma action plan and be advised to return to their GP within two - four weeks to seek an updated asthma action plan\textsuperscript{2}. Whilst provision of an interim asthma action plan at the intervention site was at a rate to be expected during a trial (93\%), provision by the control site was less than acceptable with only half (56\%) of patients leaving hospital with an interim plan.

Literature indicates that when a written asthma action plan is provided with appropriate self-management education, self-monitoring and medical review, it consistently contributes to improved asthma health outcomes. However, it is estimated that less than one quarter (24\%) of Australians possess an asthma action plan, with rates highest in 0-14 years and lowest in 25-44 years\textsuperscript{5}.

This low rate of action plan provision by general practice was also evident during this study. Of patients who had seen their GP within five weeks of discharge, only 26\% received an asthma action plan, these results are on par with literature expectations. No significant difference was seen between sites in receipt of an asthma action plan from a GP.

In summary, whilst patients who are prompted to see the GP following discharge and are followed up by Asthma Foundation may be more likely to visit their GP, they are no more likely to receive an updated asthma action plan from their GP. This is concerning considering the positive impact of action plans on health outcomes.

Strategies to formalise provision of an interim action plan by hospitals is crucial. Supporting this must be a process of linking patients with their GP post discharge for ongoing monitoring and provision of an updated asthma action plan.

5.0 Limitations

Limitations are evident in this study particularly regarding patient recruitment and retention and the resulting small sample size.
Recruitment at the control site was a significant challenge despite the efforts of the Respiratory Clinical Nurse Consultant to brief staff regularly and encourage their involvement in recruiting patients. It is assumed this was in response to resource constraints. As a result, the originally proposed method of recruiting patients prospectively was altered to retrospective recruitment. In comparison, recruitment at the intervention site was highly successful, the key difference being the allocation of staffing resources to the recruitment of patients.

The patient drop-out rate was relatively high, particularly at the intervention site, which retained only 20% of patients originally recruited. Patient participation more than halved between the time of discharge and the first phone call at week one post discharge. Comparatively however, the control site retained almost 60% of patients recruited. However, this may have been attributable to the altered recruitment process (retrospective as opposed to prospective at intervention site).

As a result of the recruitment challenges the sample size was smaller than originally anticipated and this may have affected the ability to detect meaningful differences between the intervention and control groups. However a number of items were statistically significant and there is confidence in the benefits of the intervention highlighted.

The study design included asthma education delivered to the control group at week five. While this meant that these patients also received the benefits of the education resulting in their Asthma Control Score, device use and preventer use approximating that of the intervention group, it also meant that that it wasn’t possible to explore the long term difference in these issues at the four month data collection point while assuming this cohort as a strict control.

6.0 Conclusion

This study has been useful in determining both the effectiveness and challenges of implementing a collaborative approach in supporting people to improve their asthma control.

It was anticipated that the involvement of health professionals from multiple sites in developing the Asthma Emergency Department Discharge Protocol would ensure a strategy that was suitable for implementation by a wide range of public hospitals. However, significant barriers were evident in the patient recruitment phase at the control site which prevented implementation as originally defined. Such barriers were not experienced at the trial site which had two staff members actively focused on patient recruitment and discharge education as part of their substantive role.

Patients enrolled via the intervention site received education upon discharge, two follow-up education contacts from Asthma Foundation (at one week and five weeks) and a final data collection call at four months post discharge. Control site patients received usual care at discharge (which may or may not have included education) and one follow-up education contact by Asthma Foundation (at five weeks), along with a final data collection call at four months post discharge.

Patients from the intervention site were four times as likely to be well controlled at five weeks and significantly more likely to be using their delivery device correctly. The cost of achieving this control was $282 per patient with improved control. Whether this represents value for money is essentially a value judgement, but if health outcomes are valued according to standard Australian Government rates, the value placed on improved health is likely to outweigh expenditure, delivering economic benefits of $1834 per patient enrolled in the program.
Of additional interest is the improvement witnessed in the control cohort after receipt of just one educational contact by Asthma Foundation. Within four months of discharge and receipt of one education follow-up, patient level of asthma control, accuracy of delivery device technique, use of a spacer and continued preventer use was comparable across both groups. Without a true control group at the four month time point, it is not possible to state that this is a causal relationship, but as levels are at least comparable to or greater than that seen in the general asthma population, it is reasonable to suggest that the Asthma Foundation education is at least in part responsible for these improvements. This may represent a less costly but comparably effective approach in which to support people to gain and maintain asthma control post hospital presentation.

A multi-pronged approach of education upon discharge followed by Asthma Foundation delivered education at one and five weeks results in significant and rapid improvement in two key areas – level of asthma control and accuracy of delivery device usage. Whilst an effective approach, this is the more costly of the two options. Initiatives that enable the discharging hospital to deliver a targeted, brief educational intervention in a cost effective manner, followed by at least one telephone education session delivered by Asthma Foundation shows promise in regaining asthma control in a less costly manner, albeit over a longer period of time.

7.0 Recommendations

This project has highlighted the potential benefits of a systematic and formalised process of discharge care specific to people presenting to emergency departments for asthma care. A system of discharge education plus two education follow-ups shows rapid and significant improvements in a range of asthma related measures. Interestingly however, benefits are also evident when patients have received just one education follow-up, regardless of whether they received education at time of discharge.

The challenge with asthma management remains peoples’ long term asthma self-management behaviours including continued preventer use, accuracy of delivery device technique and ensuring an ongoing relationship with their GP.

Whilst implementation of the Asthma Emergency Department Discharge Protocol contributed to rapid improvements in level of asthma control, understanding of asthma specific discharge planning could be further enhanced by prolonged studies that examine if appropriate self-management behaviours are maintained for the longer term in response this initiative. This will then enable a review of the impact of this intervention on hospital re-presentation rates and ultimately on asthma related health outcomes.
References


10. Mohsen Sadatsafavi, MD, PhD; Roxanne Rousseau, BSc; Wenjia Chen, MSc; Wei Zhang, PhD; Larry Lynd, PhD; J. Mark FitzGerald, MD; the Economic Burden of Asthma Study Team. The Preventable Burden of Productivity Loss Due to Suboptimal Asthma Control: A Population-Based Study. Chest. 2014;145(4):787-793. doi:10.1378/chest.13-1619


Appendix A – Robina Hospital Information sheet

Asthma Care Discharge Project - Improving care for people with asthma

Some people who visit hospital emergency departments with an asthma flare-up end up back in hospital soon after with another flare-up. This project aims to determine whether our health system can better support you to manage your asthma, so you are less likely to end up in hospital again with asthma.

What’s involved?
The hospital will give you:

- An interim asthma action plan – this will give you clear instructions on how to manage your asthma in the week or two after you leave hospital.
- A spacer to use with your puffier medications
- An Asthma Control Pack which contains brochures you can read and a DVD to watch to help you manage your asthma.

The hospital will refer you for extra help:

- We will give you a letter to remind you to see your GP. Be sure to see your GP within ten days of leaving hospital.
- We will refer you to Asthma Assist, an information service run by Asthma Foundation Queensland. You will be called twice over the next five weeks to discuss your asthma and to see how your asthma is going. You can also ask questions about your asthma.

What information will be collected and recorded about me?
To work out whether this program is effective in helping to keep people out of hospital, we will need to collect the following information about your asthma:

- Your level of asthma control
- Your asthma medications and how you take them
- Whether you returned to hospital within three months of your original visit
- Whether you visited your GP after being in hospital
- If your GP gave you an asthma action plan

Your individual information will not be published or released in any way. Your information will be stored in a password protected database held by Asthma Foundation Queensland. Your record will be kept after the project has finished ensuring Asthma Foundation Queensland is best able to meet your needs should you need further help in the future. If you do not wish your record to be maintained, you can request it be deleted after the project.

You are welcome to withdraw from this project at any time, without having to provide a reason, by contacting the project team on asthamassist@asthmanetqld.org.au. Your decision to withdraw will not affect the treatment or care you receive from Gold Coast Health or Asthma Foundation Queensland now or at any time in the future. If you have concerns or questions regarding this project, please contact the Gold Coast Health Patient Liaison Service on gpcls@health.qld.gov.au.

For more information on asthma, call 1800 ASTHMA (1800 278 452)

HREC/15/QGC/38
20 March 2015, Version 2
Appendix B – Robina Hospital Consent form

CONFIDENTIAL

ASTHMA CARE DISCHARGE PROJECT
To be completed by Emergency Department OR Medical Assessment Unit staff

To: Asthma Foundation Queensland  Date: 
From: Robina Hospital ED  Robina Hospital MAU

Patient consent and contact details (patient to tick and sign below)

- I give my consent to participate in the Asthma Care Discharge Project which involves:
  - My contact details being sent to and stored by Asthma Foundation Queensland. An educator will call me to discuss my asthma on two occasions in the next five weeks
  - My hospital record being checked in three months to see if I have returned to hospital for asthma
  - The information reported on my asthma will not identify me in any way.

Patient signature

Patient sticker

Who are we contacting?

- Patient
- Carer
- Partner
- Other: __________

Contact Name (if not patient):

Contact phone no.

- Mobile as above
- Home as above
- Other: __________

Interpreter required?

- No
- Yes

Language: __________

You are welcome to withdraw from this project at any time, without having to provide a reason, by contacting the project team on asthmaassist@asthmaqld.org.au. Your decision to withdraw will not affect the treatment or care you receive from Gold Coast Health or Asthma Foundation Queensland now or at any time in the future. If you have concerns or questions regarding this project, please contact the Gold Coast Health Patient Liaison Service on acplsl@health.qld.gov.au.

For more information on asthma, call 1800 ASTHMA (1800 278 462)

Privacy warning: This information is intended exclusively for the use of the Asthma Foundation Queensland. It will not be given to any other parties. If you are not the intended recipient you must not copy, distribute, take any action reliant on, or disclose any details of the information in this communication to any other person or organisation.

Gold Coast Health
Building a healthier community

MR1C/15/QGC/38
28 March 2015, Version 2
Appendix C – GCUH information sheet

Asthma Care Discharge Project
Improving care for people with asthma

Some people who visit hospital emergency departments with an asthma flare-up end up back in hospital soon after with another flare-up. This project aims to determine whether our health system can better support you to manage your asthma, so that you are less likely to end up in hospital again with asthma.

What’s involved?
We will refer you to Asthma Assist, an information service run by Asthma Foundation Queensland. An educator will call you five weeks after you leave hospital to chat about your asthma and assess your level of control. This educator will also be able to answer questions you may have about managing your asthma.

What information will be collected?
To work out whether this program is effective in helping to keep people out of hospital, we will need to collect and record the following information about your asthma:

- Your level of asthma control
- Your asthma medications and how you take them
- Whether you visited the GP for your asthma after you left hospital
- If the GP gave you an asthma action plan
- Whether you visited a hospital emergency department for asthma within three months of your original visit.

Your individual information will not be published or released in any way. Your information will be stored in a password protected database held by Asthma Foundation Queensland. Your record will be kept after the project has finished ensuring Asthma Foundation Queensland is best able to meet your needs should you need further help in the future. If you do not wish your record to be maintained, you can request it be deleted after the project.

You are welcome to withdraw from this project at any time, without having to provide a reason, by contacting the project team on asthmaassist@asthmaqld.org.au. Your decision to withdraw will not affect the treatment or care you receive from Gold Coast Health or Asthma Foundation Queensland now or at any time in the future.

If you have concerns or questions regarding this project, please contact the Gold Coast Health Patient Liaison Service on gcpls@health.qld.gov.au.

For more information on asthma, call 1800 ASTHMA (1800 278 462)

HREC/15/GGC/38
20 March 2015, Version 2
## CONFIDENTIAL

**ASTHMA CARE DISCHARGE PROJECT**

To be completed by Emergency Department OR Medical Assessment Unit staff

<table>
<thead>
<tr>
<th>To</th>
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<th>Date</th>
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<tbody>
<tr>
<td>To</td>
<td></td>
<td>Date</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Patient consent and contact details** (patient to tick and sign below)

- I give my consent to participate in the Asthma Care Discharge Project which involves:
  - My contact details being sent to and stored by Asthma Foundation Queensland. An educator will call me in five weeks to monitor my asthma.
  - My hospital record being checked in three months to see if I have returned to hospital for asthma.
  - The information reported on my asthma will not identify me in any way.

**Patient signature**

**Patient sticker**

<table>
<thead>
<tr>
<th>Who are we contacting?</th>
<th>Patient</th>
<th>Carer</th>
<th>Partner</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Name (if not patient):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Contact phone no.</th>
<th>Mobile as above</th>
<th>Home as above</th>
<th>Other</th>
</tr>
</thead>
</table>

**Interpreter required?**

<table>
<thead>
<tr>
<th>Interpreter required?</th>
<th></th>
<th></th>
</tr>
</thead>
</table>

You are welcome to withdraw from this project at any time, without having to provide a reason, by contacting the project team on asthmaassist@asthmaqld.org.au. Your decision to withdraw will not affect the treatment or care you receive from Gold Coast Health or Asthma Foundation Queensland now or at any time in the future. If you have concerns or questions regarding this project, please contact the Gold Coast Health Patient Liaison Service on.gcah@health.qld.gov.au.

For more information on asthma, call 1800 ASTHMA (1800 278 462)

**Privacy warning:** This information is intended exclusively for the use of the Asthma Foundation Queensland. It will not be given to any other parties. If you are not the intended recipient you must not copy, distribute, take any action reliant on, or disclose any details of the information in this communication to any other person or organisation.
Appendix E – Interim asthma action plan

You have been to the hospital with a flare-up of your asthma on __________ (insert date).
This plan explains how to manage your asthma during this flare-up and should help bring your asthma back under control. Please follow the plan below until you see your GP and get another action plan completed within two weeks.

### Blue/grey reliever
- Take ______ puffs of __________ every ______ hours

### Preventer
- Take ______ puffs of Fixotide ______ µg ______ times a day
- Take ______ puffs of Seretide ______ µg ______ times a day
- Take ______ puffs of Symbicort ______ µg ______ times a day
- Take ______ puffs of Breo ______ µg ______ once / day
- Take ______ puffs of Pulmicort ______ µg ______ times a day
- Take ______ puffs of Flutiform ______ µg ______ times a day

### Symbicort SMART protocol
- Take ______ puffs of Symbicort ______ µg ______ times a day AND as your reliever when required.
  - If you need more than 6 reliever inhalations each day, over 2-3 days, contact your doctor.
  - If you need more than 12 Symbicort inhalations in any day, you MUST go to hospital the same day.

- Take ______ puffs of Rapihaler ______ µg ______ times a day AND as your reliever when required.
  - If you need more than 12 reliever inhalations each day, over 2-3 days, contact your doctor.
  - If you need more than 24 Symbicort inhalations in any day, you MUST go to hospital the same day.

### Prednisolone tablets
- Take ______ mgs or ______ x ______ mg tablets once a day for ______ days

### Other instructions

Make an appointment NOW to see your GP for follow-up and an updated Asthma Action Plan.

The Asthma Clinic staff can help you from Monday – Friday 7:30am – 4.00pm at Robina Hospital 0403 604 625 or Gold Coast University Hospital 0412 975 483 and will call you in the next two weeks with your follow-up appointment.

For further information about asthma, call Asthma Foundation Queensland on 1800 ASTHMA (1800 278 462, 9am – 4pm Mon – Fri) or visit asthmaustralia.org.au
Dear Dr,

[Insert patient sticker here.]

Name:
DOB:
UR:
Address and telephone number:

presented to our Emergency Department on

________________________  at _____ : _____

(with date)

with an asthma flare-up.

He/she has been treated and an interim action plan supplied. He/she has agreed to be referred to Asthma Foundation Queensland for information and education regarding asthma.

Please follow-up with your patient as soon as possible.

Yours sincerely,

________________________

Dr

☐ Gold Coast University Hospital  ☐ Robina Hospital

Asthma Foundation Queensland
1800 ASTHMA (1800 278 462)
asthmaaustralia.org.au