



# The effect of an inflammatory bowel disease nurse position on service delivery ☆

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## Abstract

Inflammatory bowel disease (IBD) management is increasingly concentrated in units with expertise in the condition leading to substantial improvement in outcomes. Such units often employ nurses with a specialised interest in IBD with enhancements in care reflecting in part the promotion of more efficient use of medical and hospital services by this role. However, the relative contributions of nurse specialist input, and the effect of medical staff with a sub-speciality interest in IBD are unclear although this has major implications for funding. Determining the value of IBD nurses by assessing the direct impact of an IBD nurse on reducing admissions and outpatient attendances has immediate cost benefits, but the long-term sustainability of these savings has not been previously investigated.

We therefore assessed the effect of an IBD nurse on patient outcomes in a tertiary hospital IBD Unit where the position has been established for 8 years by measuring the number of occasions of service (OOS) and outcomes of all interactions between the nurse and patients in a tertiary hospital IBD Unit over a 12-month period.

There were 4920 OOS recorded involving 566 patients. IBD nurse intervention led to avoidance of 27 hospital admissions (representing a saving of 171 occupied bed days), 32 Emergency Department presentations and 163 outpatient reviews. After deducting salary and on-costs related to the IBD nurse there was a net direct saving to the hospital of AUD \$136,535.

IBD nurse positions provide sustained direct cost reductions to health services via reducing hospital attendances. This is additional to benefits that accrue through better patient knowledge, earlier presentation and increased compliance.

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## 1. Introduction

Patients with Inflammatory Bowel Disease (Crohn's Disease [CD], Ulcerative Colitis [UC] and Indeterminate Colitis [IC]) are recognised to have complex management requirements that are best managed by a dedicated IBD service.<sup>1</sup> Although Inflammatory Bowel Disease (IBD) nurse positions have been increasingly considered to represent standard of care, their value in the acute hospital setting is still debated.<sup>2-4</sup> Potential advantages accruing from the IBD Nurse position relate in part to rapid access to advice, counselling and support via a single fixed "first point of contact" for patients, their families, GPs and non-IBD external gastroenterologists. At the most basic level this can be seen to facilitate prompt recognition of symptoms and early intervention during disease flares with consequent reduction in hospital admissions and outpatient appointments. However as in other areas where nurse led services have been established,<sup>5,6</sup> IBD nurse specialists facilitate a streamlined patient journey within acute care, and across acute and primary care services via liaison with other health professionals, including gastroenterologists, surgeons, pharmacists, dieticians and family physicians. In addition, the IBD nurse also has expertise in the development of Chronic Disease self-management skills via individualisation of patients/families education to develop understanding of IBD pathophysiology and rationale for treatments. This has led to the recommendation that access to an IBD nurse should be regarded as "standard of care" for patients with inflammatory bowel disease.<sup>7</sup>

However, a 2009 Cochrane review of the literature found limited evidence in the literature for improved outcomes from specialist nurse intervention for patients with IBD.<sup>3</sup> However this conclusion was based on a single study with questionable methodological quality.<sup>8</sup> A second review also suggested the data that supported dedicated IBD nurses improve outcomes remains weak.<sup>4</sup> This is in contradistinction to the similarities in outcomes between nurse led follow-up of patients with IBD compared with gastroenterologist follow-up, and more rapid treatment initiation after relapse.<sup>9</sup> In order to support ongoing funding of the IBD nurse position, understanding the contribution of the IBD nurse to the outcomes of patients with IBD managed in an established IBD centre is critical, and not widely covered in the current literature.

The improvement in outcomes by introducing a sub-speciality service with an IBD nurse has been well described, but it is not clear from this data the extent to which improvement was driven by the IBD nurse within that new service or the presence of an IBD specialist clinic.<sup>2,10</sup> The current study was therefore designed to examine the effectiveness of an IBD nurse role within a well-established IBD service by measuring all contacts (occasions of service) between the nurse and IBD patients and the effect of these on patient management and efficiency of care with resultant cost savings.

## 2. Materials and methods

### 2.1. Setting

The IBD service at Flinders Medical Centre is an established service which manages 1211 patients with inflammatory

bowel disease. It functions as a tertiary referral centre for the management of inflammatory bowel disease with 138 patients on biological therapies at the time of the study. There is a dedicated Outpatient clinic 2 days a week, employing 5 gastroenterologists with a defined interest in IBD. In parallel with this is an inpatient service for patients who require hospitalisation. For the last 8 years there has been a dedicated IBD nurse employed within the service.

### 2.2. Categories of intervention

In the calendar year of 2011 all patient related activity performed by the IBD nurse was prospectively recorded. Each patient related activity was termed an occasion of service (OOS), and could have one of the following management consequences:

- a) Hospital admission avoidance.
  - *Admission avoided*: patient managed successfully at home with close follow-up, instead of requiring inpatient care Patient assessed by IBD Nurse as having moderately severe symptoms warranting admission with any further deterioration.
- b) Emergency department avoidance.
  - *Streamlined emergency department admission*: patient assessed by IBD Nurse (with registrar/consultant input) as requiring admission and review within the emergency department and admitted through the Emergency Department (ED). The ED notified Gastroenterology team on patient's arrival, who then attended ED to assess/admit patient.
  - *Streamlined direct admission to ward bed*: patient assessed by IBD Nurse (with registrar/consultant input) as requiring admission, but stable enough to be admitted directly to a ward bed, avoiding ED. The patient was reviewed on arrival in ward by the Gastroenterology team.
  - *Planned admission*: patient booked elective admission (usually within <10 days).
  - *Urgent clinic review*: patient assessed by IBD Nurse as requiring urgent outpatient review is booked into IBD clinic <1 week from contact.
- c) Outpatient clinic avoidance.
  - *Clinic review avoided*: significant medication adjustment, patient or general practitioner education, medication initiated or investigation arranged where this would otherwise have required consultant review in IBD clinic.
- d) Quality improvement activity.
  - Inpatient reviews to facilitate patient understanding of condition and compliance with therapy.
  - Patient counselling on medication use/immunisations/disease management.
  - Review of blood tests to screen for toxicity secondary to immunomodulator (e.g. purinethol analogues and methotrexate) use.
  - Review of accuracy of information being submitted for inclusion into IBD data base.

Data were collected by the IBD nurse, with quarterly external review by the General Practice Plus programme of

the Population and Primary Healthcare Directorate in the Southern Adelaide Local Health Network. This quarterly external review was designed to provide a continuous, prospective, assessment of the impact of ambulatory care programmes across disciplines within the network. Inpatient length of stay and IBD admission data was collected by the Quality Improvement Officer, Division of Surgery and Specialties at Flinders Medical Centre.

Patients for whom occasions of service were recorded were stratified by disease type (Crohn's disease, Ulcerative Colitis or Indeterminate colitis), location (metropolitan or non-metropolitan) and management with biological therapies. The proportions were compared with the proportions on the active patient data base to determine the relative use of IBD nurse service by different subgroups.

### 2.3. Assessments of savings

The cost of hospital admission for IBD for was calculated from that provided by an earlier study performed in the same city on a large group of patients.<sup>2</sup> The cost of outpatient clinic and Emergency Department review saved by the interventions was obtained from hospital financial records (Casemix Unit, Southern Adelaide Local Health Network). The estimated number of bed days saved was based on the length of stay (LOS) of patients admitted during the study period.

#### 2.3.1. Data analysis

Data are mean  $\pm$  SEM. Statistical comparisons were by chi-squared analysis. A p value of  $<0.05$  was accepted as significant in all analyses.

## 3. Results

### 3.1. Patient demographics

The IBD nurse provided 4920 occasions of service between Jan 1st and December 31st 2011. The majority of patients required more than one occasion of service for review and subsequent communication of management decisions. However 292 patients had  $>10$  occasions of service, and 134 required  $>20$  occasions of service.

A total of 566 patients (M 258, F 308) patients, with a mean age of 38.8 years received interventions by the IBD nurse. In 339 patients the underlying diagnosis was Crohn's disease whilst 141 patients had ulcerative colitis. Three patients were considered to have indeterminate colitis. A further 83 patients initially referred to the IBD nurse and subsequently assessed in the IBD Clinic were found to have a diagnosis other than inflammatory bowel disease, and were referred to the appropriate service elsewhere.

One hundred and four patients (29 of them newly diagnosed with IBD) underwent an inpatient review. These patients were provided with counselling, together with reviews of issues such as bone density measurement, immunisation status, assessment of the patient's understanding of their disease, treatments/adherence and blood monitoring.

Patients with Crohn's disease had a significantly higher number of occasions of service compared to patients with ulcerative colitis (11.0 vs 6.4 OOS per patient,  $p < 0.0001$ ).

In the 2011 period non-metropolitan patients represented 498 of the 1211 patients on the IBD data base (41%), and were responsible for 2441 (49.6%) of the occasions of service.

### 3.2. Change in care resulting from IBD nurse interventions

In the study period, 27 patients avoided admission through the intervention of the IBD nurse, within a total of 132 admissions. A further 32 patients who were admitted did not require attendance at the emergency department, either due to streamlined admission directly to the ward or by facilitation of a subsequent elective admission. One hundred and sixty three patients avoided a clinic appointment, with management decisions being communicated to the patient by phone or email. (Total IBD clinic reviews performed in 2011 = 824 + 163 avoided clinic reviews = 16.5% reduction (Table 1).)

### 3.3. Cost implications of IBD nurse interventions

The mean duration of admission for IBD patients with IBD in 2011 was 6.3 days. Thus avoidance of admission resulted in 171 occupied bed days not being required by the hospital. There was a further efficiency dividend by the reduction of presentations to emergency department by 32.

Previous studies have shown that each hospital admission for IBD in South Australia costs an average of \$7957.<sup>2</sup> The avoidance of 27 admissions through urgent clinic reviews equates to a saving of \$214,839. Further savings of \$48,284 are realised through avoidance of outpatient clinic reviews (163 clinic appointments avoided at a cost of \$244) and Emergency Department presentations (32 reviews avoided by direct admission  $\times$  \$266), although this was partially offset by the cost of the emergency clinic reviews (27  $\times$  \$244) and the cost of the IBD nurse (\$120,000 including on costs). In total, however, there was still an estimated saving of \$136,535.

## 4. Discussion

Development of specialised clinics has led to improvement in a number of quality indicators in the management of inflammatory bowel disease. For example, patients managed by a gastroenterologist with an identified interest in IBD have better outcomes when hospitalised.<sup>11</sup> In addition the development of inflammatory bowel disease services

**Table 1** Effect of IBD nurse of avoidance of hospital services.

	Actual	Avoided	Percentage of potential total avoided
Hospital admissions	134	27	27 of 161 (17%)
Clinic appointments	824	163	163 of 987 (16%)

often including specialist IBD nurses has also resulted in improved patient management.<sup>2</sup> However, whether the addition of the IBD nurse provides added benefit to a specialist clinic already staffed by gastroenterologists with a specific interest in inflammatory bowel disease, remains debated.<sup>3,4</sup> Furthermore, much of the data on benefit is based on studies with limited (one year or less) follow-up after the introduction of the role.<sup>8,11,12</sup>

The current study determined the effectiveness of a well established (>8 years) IBD nurse role, within an established tertiary referral IBD service, with a particular focus on reducing presentations to the hospital, emergency department and clinic. The data show that even within a specialised service, the IBD nurse has a major impact on hospital admissions, clinic utilisation and ED attendances. Much of this intervention is done through telephone and email contact, consistent with the literature describing the utility of "virtual clinics" where patients are followed via IBD nurse specialist through such means, enabling a more flexible and patient focused approach to management.<sup>13,14</sup> This flexibility of management has been demonstrated to be preferred by patients with a preference for "virtual care" as an adjunct to traditional face to face consultation.<sup>15</sup> This use of "virtual" contact does provide for concrete benefit with the intervention of the IBD nurse resulting in a 17% saving in hospital admissions (161 potential cf 134 actual admissions for management of IBD). Similarly of those who required admission 24% (32 patients) were able to be streamlined directly to the ward and avoid the ED. This resulted in a significant saving in costs to the health service. These data are consistent with those reported previously immediately following the establishment of a specialised service and indicate that the specialist nurse role provides an ongoing contribution to the efficiency of management of patients with IBD.

The IBD nurse was significantly more utilised by patients with Crohn's disease (mean OOS 11 vs 6.4 for ulcerative colitis), representing 20 of the 27 (75%) of avoided admissions and 114 of the 163 (70%) of avoided clinic attendances. It has previously been demonstrated that patients with Crohn's disease have greater anxiety levels and it may be that the IBD nurse is fulfilling a need for more counselling and psychological support in these patients.<sup>8</sup> Patients from non-metropolitan areas also used the service to a greater extent (mean OOS 10.3 vs 7.6 for metropolitan residents, representing 82% of avoided admissions and 67% of clinic avoidance). The high utilisation of the IBD nurse by the non-metropolitan population suggests that the IBD nurse may play a major role in the support of patients in areas where there is limited specialist infrastructure.

The study has a number of weaknesses. It is based around the self-reporting of the IBD nurse's activity, providing a potential for bias. However, we have tried to minimise this by collecting the data in a prospective manner according to pre-determined criteria determined by an external agency whose role was to assess the effectiveness of a variety of ambulatory care programmes. This agency (the GP Plus programme) also reviewed the collected data independently every 3 months. It remains difficult to definitely be certain which patient would have been admitted without the IBD nurse role stepping in and organising urgent clinic review or follow-up, even if we over estimated by 50% the number of

avoided admissions the IBD nurse role would have been "cost neutral". The study is focused on the effect of the IBD nurse role of outpatient, ED and hospital avoidance and so does not attempt to calculate the positive effect of increased adherence to and enhanced monitoring of medication, improved access to counselling and development of patient centred disease action plans which are all part of the IBD nurse role.

This study demonstrates that the IBD nurse position reduces hospital admissions and clinic reviews. Instead of the traditional model of outpatient clinics and emergency department presentation when the disease flares, the IBD nurse provides accessible advice, and flexible consultation through a "virtual clinic" conducted through phone and email contact, providing efficient triaging of those who flare to either phone management with rapid clinic review if required, or to streamlined admission.

## Conflict of interest

No authors had a conflict of interest with respect to this manuscript.

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Author PL acquired the study data, and the design of the study and the IBD nurse role was performed by authors MDS, RM, SE, LC and PB. The manuscript was prepared by PL, RF and PB and was approved of by all the authors.

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