

## Putting NICE guidance into practice

### **Resource impact report: Diverticular disease: diagnosis and management (NG147)**

Published: November 2019

## Summary

This report focuses on the recommendations from NICE's guideline on [diverticular disease](#) that we think will have the greatest resource impact nationally (for England), and will potentially generate the biggest savings.

They are:

- if the person has raised inflammatory markers, offer a contrast CT scan within 24 hours of hospital admission to confirm diagnosis and help plan management (recommendation 1.3.5)
- if the person has CT confirmed uncomplicated acute diverticulitis, review the need for antibiotics and discharge them depending on co-existing conditions (recommendation 1.3.12)
- offer either laparoscopic lavage or resectional surgery to people with diverticular perforation with generalised peritonitis. If faecal peritonitis is identified intraoperatively, proceed to resectional surgery. (recommendation 1.3.26).

### Resource impact

The estimated resource impact of implementing this guideline for the population of England in the next 5 years is a saving of around £0.2 million in 2019/20 rising to a saving of around £5.3 million per annum from 2023/24. The benefit for CCG's is from the impact of changes to tariffs. Secondary care will have the benefit of efficiency gains and a reduction in spend on antibiotics. Primary care will benefit from the reduction in subsequent stoma care. Table 1 shows the split of savings. The savings result from:

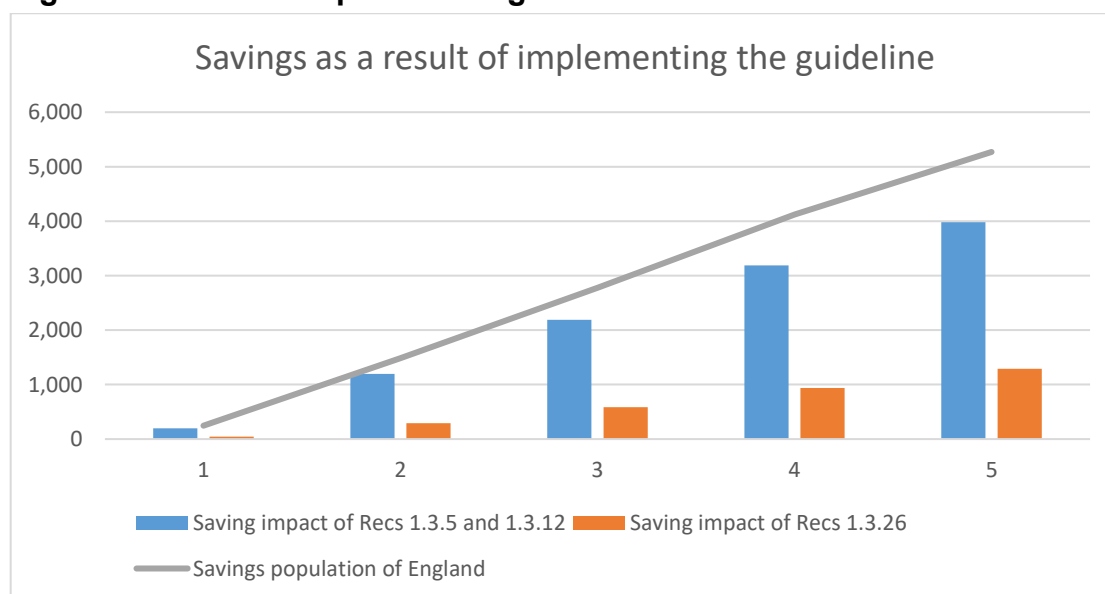
- earlier discharge from hospital for people with uncomplicated acute diverticulitis
- a reduction in the use of IV antibiotics
- a reduction in the number of people having resectional surgery first line and subsequent stoma care

The additional cost of resectional surgery following laparoscopic lavage has been factored into the above analysis.

**Table 1 Estimated annual saving of implementing the guideline**

	2019/20 (£000s)	2020/21 (£000s)	2021/22 (£000s)	2022/23 (£000s)	2023/24 (£000s)
<b>Estimated savings for recommendations 1.3.5 and 1.3.12 (CCG's &amp; secondary care)</b>	<b>199</b>	<b>1,194</b>	<b>2,190</b>	<b>3,185</b>	<b>3,982</b>
Estimated savings of change in procedure for recommendation 1.3.26 (CCG's and secondary care)	37	220	403	586	733
Estimated savings of change in stoma care for recommendation 1.3.26 (CCG's and primary care)	10	72	185	350	555
<b>Estimated savings for recommendations 1.3.26</b>	<b>47</b>	<b>292</b>	<b>588</b>	<b>936</b>	<b>1,288</b>
<b>Estimated savings for the population of England</b>	<b>246</b>	<b>1,486</b>	<b>2,778</b>	<b>4,121</b>	<b>5,270</b>
Estimated savings per 100,000 population	0	3	5	7	9

**Figure 1 Resource impact of the guideline**



## **Introduction**

- 1.1 The guideline offers best practice advice on diverticular disease.
- 1.2 This report discusses the resource impact of implementing our guideline on diverticular disease in England. It aims to help organisations plan for the financial implications of implementing this NICE guideline.
- 1.3 A resource impact template accompanies this report to help with assessing the resource impact at a local level in England, Wales or Northern Ireland.
- 1.4 We have considered direct costs and savings to the NHS (and local authorities if applicable) and not those for the individual, the private sector or the not-for-profit sector. Any cost savings arising from a change in practice have been offset against the cost of implementing the change.
- 1.5 Diverticular disease services are commissioned by clinical commissioning groups. Providers are NHS hospital trusts and community providers.

## **2 Background**

- 2.1 Diverticulosis is the presence of diverticula (pockets in the wall of the digestive tract) without symptoms.
- 2.2 Diverticular disease is the presence of diverticula with mild abdominal pain or tenderness and no systemic symptoms.
- 2.3 Acute diverticulitis is a sudden inflammation or infection associated with diverticula.
- 2.4 People with uncomplicated acute diverticulitis can usually have their condition managed at home, by their GP. Those with

symptoms suggesting complications should be assessed at hospital. People with suspected complications such as abscesses and perforations are admitted to hospital, often without receiving a CT scan.

### **3 Significant resource impact recommendations**

There are 3 guideline recommendations that are likely to lead to a significant resource impact when implemented. Two of these are considered together in section 3.1, the third is considered separately in section 3.2.

**3.1 If the person with suspected complicated acute diverticulitis has raised inflammatory markers, offer a contrast CT scan within 24 hours of hospital admission to confirm diagnosis and help plan management. If contrast CT is contraindicated perform:**

- a non-contrast CT or
- an MRI, or
- an ultrasound scan, depending on local expertise.

**(Recommendation 1.3.5).**

**If the person has CT-confirmed uncomplicated acute diverticulitis, review the need for antibiotics and discharge them depending on any co-existing medical conditions.**

**(Recommendation 1.3.12)**

#### **Background**

3.1.1 There were around 29,000 emergency admissions for acute diverticulitis during 2017/18 (Hospital Episodes Statistics (HES) data from NHS Digital).

#### **Assumptions made**

3.1.2 Expert clinical opinion is that currently around 40% of people who are admitted as an emergency admission with acute diverticulitis do

not receive a computerised tomography (CT) scan, and 60% of people do currently receive a CT scan to confirm their diagnosis.

- 3.1.3 Expert clinical opinion is that when people do not receive a CT scan, they are treated in hospital as though they have complicated acute diverticulitis. It is assumed 70% of these people are currently admitted as long stay patients and 30% as short stay patients.
- 3.1.4 When people receive a contrast CT scan, around 87% are diagnosed as having uncomplicated acute diverticulitis, 11% as having complicated acute diverticulitis and the remaining 2% as having another diagnosis ([Bharucha, A et al 2015](#)).
- 3.1.5 Based on clinical expert opinion from committee experts, people with uncomplicated acute diverticulitis are currently treated with oral antibiotics and people with complicated acute diverticulitis are treated with IV antibiotics. The guideline recommends that this should continue.
- 3.1.6 It is assumed, based on clinical expert opinion, that a significant number of people who are currently treated with oral antibiotics will receive co-amoxiclav 500/125mg 3 times a day for 5 days, unless they have a penicillin allergy and they would receive an appropriate alternative.
- 3.1.7 It is assumed that the remaining 2% of people who have a different diagnosis, are treated in hospital for 5 days ([health economic modelling](#)).
- 3.1.8 Expert clinical opinion is that in future practice, 90% of emergency admissions for acute diverticulitis will receive a CT scan and 10% will not.
- 3.1.9 It is assumed in future practice, following a CT scan, the same percentage of people will have uncomplicated acute diverticular disease, complicated acute diverticular disease and other

diagnoses. It is also assumed that these people will be treated in the same way as how they are currently treated.

**Table 2 Current and future practice for people who have an emergency admission for acute diverticulitis.**

Population	Current practice		Future practice	
	%	Number	%	Number
<b>People who have an emergency admission for acute diverticulitis (a) (a=b+c)</b>		<b>29,000</b>		<b>29,000</b>
People with diverticular disease who are admitted to hospital and do not receive a CT scan (b)	40.0	11,600	10.0	2,900
People with diverticular disease who are admitted to hospital and receive a CT scan (c)	60.0	17,400	90.0	26,100
People who receive a CT scan and have uncomplicated acute diverticular disease (d)	87.1	15,200	87.1	22,700
People who receive a CT scan and have complicated diverticular disease (e)	10.9	1,900	10.9	2,900
People who receive a CT scan and have another diagnosis (f)	2.0	300	2.0	500
<b>Total (c) (c=d+e+f)</b>	<b>100</b>	<b>17,400</b>	<b>100</b>	<b>26,100</b>

## Costs

3.1.10 Table 3 summarises the NHS cost of treatment per person for people admitted to hospital with acute diverticulitis as an emergency.

**Table 3 Cost of treatment options – per patient per year**

Treatments	Reference	£
People who are treated in hospital for complicated acute diverticulitis and do not receive a CT scan.	FD10E-L Non-malignant Gastrointestinal Tract Disorders ( <a href="#">National Tariff 2019/20</a> ), weighted by <a href="#">reference cost activity 2017/18</a> , <b>split 70% as long stay and 30% as short stay.</b>	1,658
People who have uncomplicated acute diverticulitis diagnosed by a CT scan and who are discharged from hospital with oral antibiotics.  Co-amoxiclav 500/125mg 3 times a day for 5 days (£1.18 including VAT).	FD10E-L Non-malignant Gastrointestinal Tract Disorders, short stay, National Tariff 2019/20, weighted by reference cost activity 2017/18. <a href="#">Drugs and pharmaceutical electronic market information tool (eMIT)</a>	846
People who are treated in hospital for complicated acute diverticulitis and receive a CT scan.	FD10A-H Non-malignant Gastrointestinal Tract Disorders(National Tariff 2019/20), weighted by reference cost activity 2017/18, <b>100% long stay.</b>	3,949
Alternative diagnosis following a CT scan	5 days inpatient stay, based on the health economics for <a href="#">NICE Guideline NG147</a> , Diverticular disease	1,645

### Resource impact

3.1.11 The net resource impact of scanning people in hospital with acute diverticulitis and discharging with oral antibiotics those with uncomplicated acute diverticular disease is summarised in table 4.



**Table 4 Estimated annual saving of recommendations 1.3.5 and 1.3.12**

	<b>Current practice</b>	<b>2019/20</b>	<b>2020/21</b>	<b>2021/22</b>	<b>2022/23</b>	<b>2023/24</b>
Implementation rate		5%	30%	55%	80%	100%
<b>People treated in hospital for acute diverticulitis and who have not received a CT scan</b>						
Number of people	11,600	11,160	8,986	6,812	4,638	2,899
Cost (£000s)	19,221	18,500	14,896	11,292	7,688	4,805
<b>People treated in hospital for uncomplicated acute diverticulitis who have received a CT scan</b>						
Number of people	15,149	15,527	17,421	19,315	21,208	22,733
Cost (£000s)	12,810	13,130	14,731	16,332	17,933	19,214
<b>People treated in hospital for complicated acute diverticulitis who have received a CT scan</b>						
Number of people	1,897	1,944	2,181	2,418	2,655	2,845
Cost (£000s)	7,490	7,677	8,613	9,549	10,486	11,235
<b>People who have another diagnosis following a CT scan</b>						
Number of people	348	357	400	444	487	522
Cost (£000s)	572	587	658	730	801	858
<b>Total cost (£000s)</b>						
	<b>40,089</b>	<b>39,890</b>	<b>38,895</b>	<b>37,899</b>	<b>36,904</b>	<b>36,108</b>
<b>Savings - population of England (£000s)</b>						
	<b>0</b>	<b>199</b>	<b>1,194</b>	<b>2,190</b>	<b>3,185</b>	<b>3,982</b>
<b>Savings per 100,000 population (£000s)</b>						
	0	0	2	4	6	7

### **Benefits and savings**

3.1.12 There will be a reduced length of stay in hospital for people with uncomplicated acute diverticulitis. This will create cash releasing savings for clinical commissioning groups. There will also be efficiency savings for providers who are able to free up capacity to treat other people.

- 3.1.13 People will also be discharged from hospital more quickly so that they can be treated at home rather than in hospital.

### **Other considerations**

- 3.1.14 There will be an increase in the number of contrast CT scans for people with acute diverticulitis. Organisations are advised to assess the impact locally, but it is anticipated that demand will be less than 1 per week at an individual provider level.

- 3.1.15 The increase in contrast CT scans is expected to lead to a reduction in the number of endoscopies to assess people with acute diverticulitis for the severity of the disease.

- 3.2 **Offer either laparoscopic lavage or resectional surgery to people with diverticular perforation with generalised peritonitis after discussing the risks and benefits of the 2 options with them. If faecal peritonitis is identified intraoperatively, proceed to resectional surgery. (Recommendation 1.3.26)**

### **Background**

- 3.2.1 People who have a perforation of the bowel as a result of acute diverticulitis are currently treated with a bowel resection. This often requires long term stoma care following the intervention which can have a significant impact on the person.

- 3.2.2 During 2017/18 there were around 1,700 people in England with diverticular disease who had a perforation of the bowel, (HES data, NHS Digital 2017/18). The offer of both interventions should be discussed with the person and a decision on which intervention to be performed is normally made on the person's preference.

### **Assumptions made**

- 3.2.3 Expert clinical opinion is that currently around 90% of people with diverticular disease who have a perforation of the bowel are treated

by resectional surgery. The remaining 10% of people are treated with laparoscopic lavage.

- 3.2.4 It is assumed that people having resectional surgery will not have a reversal resection and that they will all require long term stoma care.
- 3.2.5 Out of the 10% of people that currently receive laparoscopic lavage, it is assumed that 27% of these people will also have a resection to treat a perforation of their bowel.
- 3.2.6 Expert clinical opinion is that in future practice, 80% of people with diverticular disease who have a perforation of the bowel will be treated by resectional surgery and 20% will be treated with laparoscopic lavage.
- 3.2.7 It is assumed that in future practice the same percentage of people will have a resection after laparoscopic lavage as they do in current practice and that they will be treated in the same way as they are currently treated.
- 3.2.8 The costs of treating a bowel perforation with resectional surgery, including stoma care appointments for the first year are around £8,560. This is based on the weighted average of ([National Tariff 2019/20](#)) FF33 Distal Colon Procedures and FF31 Complex Large Intestine Procedures and weighted by [reference cost activity 2017/18](#).
- 3.2.9 First year stoma care appointments include 6 appointments with the community stoma care nurse. There will also be an additional cost for an annual supply of stoma consumables.
- 3.2.10 In subsequent years there will be an annual stoma care check-up, provided by the local community stoma care nursing service and stoma care supplies for each year.

3.2.11 The cost of treating a bowel perforation with laparoscopic lavage is around £1,950. This is based on the weighted average of ([National Tariff 2019/20](#)) FF52A-D Intermediate Therapeutic General Abdominal Procedures and weighted by [reference cost activity 2017/18](#).

**Table 5 Current and future practice for people who have a perforation of the bowel as a result of having diverticular disease.**

Population	Current practice		Future practice	
	%	Number	%	Number
<b>People who have a perforation of the bowel</b>		<b>1,700</b>		<b>1,700</b>
People who have a perforation of the bowel and resectional surgery	90	1,530	80	1,360
People who have a perforation of the bowel and laparoscopic lavage (a)	10	170	20	340
People who have a resection following laparoscopic lavage (a x 27%)	27	45	27	90

### Costs

3.2.12 Table 6 highlights the costs of treating a perforation of the bowel.

**Table 6 Cost of treating a perforation of the bowel – per patient per year**

Treatments	£
People who have a perforation of the bowel and are treated with a resection including the first year's stoma care	8,560
Subsequent years stoma care	1,650
People who have a perforation of the bowel and are treated with lavage	1,950

### Resource impact

3.2.13 The resource impact of implementing recommendation 1.3.26 is summarised in table 7.

**Table 7 Resource impact of recommendation 1.3.26**

	2019/20	2020/21	2021/22	2022/23	2023/24
Implementation rate	5%	30%	55%	80%	100%
<b>Current practice</b>					
<b>People treated with a resection</b>					
Number of people	1,530	1,530	1,530	1,530	1,530
Cost (£000s)	13,147	13,147	13,147	13,147	13,147
<b>Subsequent stoma care</b>					
Number of people	1,535	3,071	4,606	6,141	7,677
Cost (£000s)	2,535	5,070	7,605	10,140	12,674
<b>People treated with laparoscopic lavage</b>					
Number of people	170	170	170	170	170
Cost (£000s)	333	333	333	333	333
<b>People treated with resection following laparoscopic lavage</b>					
Number of people	46	46	46	46	46
Cost (£000s)	394	394	394	394	394
<b>Subsequent stoma care</b>					
Number of people	46	92	138	184	230
Cost (£000s)	76	152	228	304	380
<b>Total cost (£000s)</b>	<b>16,486</b>	<b>19,097</b>	<b>21,708</b>	<b>24,319</b>	<b>26,930</b>
<b>Future practice</b>					
<b>People treated with a resection</b>					
Number of people	1,527	1,479	1,437	1,394	1,360
Cost (£000s)	13,074	12,709	12,344	11,979	11,687
<b>Subsequent stoma care</b>					
Number of people	1,527	3,011	4,453	5,851	7,216
Cost (£000s)	2,521	4,971	7,351	9,661	11,914
<b>People treated with laparoscopic lavage</b>					
Number of people	179	222	264	307	341
Cost (£000s)	350	433	517	600	667
<b>People treated with resection following laparoscopic lavage</b>					
Number of people	48	60	71	83	92
Cost (£000s)	414	513	611	710	789
<b>Subsequent stoma care</b>					
Number of people	48	108	180	263	355
Cost (£000s)	80	179	297	433	586
<b>Total cost (£000s)</b>	<b>16,439</b>	<b>18,805</b>	<b>21,120</b>	<b>23,383</b>	<b>25,641</b>

<b>Savings - population of England (£000s)</b>	<b>47</b>	<b>292</b>	<b>588</b>	<b>936</b>	<b>1,288</b>
Savings per 100,000 population (£000s)	0	1	1	2	2

### **Benefits and savings**

- 3.2.14 There are benefits to people who will no longer need long-term stoma care.
- 3.2.15 Laparoscopic lavage is a less invasive operation that reduces hospital length of stay. This may allow providers to use their resources more efficiently.

### **Other Considerations**

- 3.2.16 Not all bowel resections can be reversed and therefore it is assumed in the template that none of the resections are reversed. Where bowel resections are currently being reversed there will be a saving from the reduced stoma care needed and an increase in surgical costs for the reversal.

## **4 Resource impact over time**

- 4.1 The estimated annual saving of implementing this guideline for the population of England based on the uptake in the resource impact assumptions is shown in table 8. The saving from year 5, once steady state is reached, is equivalent to £9,500 per 100,000 population.

**Table 8 Resource impact of implementing the guideline using NICE assumptions**

	2019/20 (£000s)	2020/21 (£000s)	2021/22 (£000s)	2022/23 (£000s)	2023/24 (£000s)
<b>Estimated savings for recommendations 1.3.5 and 1.3.12 (CCG's &amp; secondary care)</b>	<b>199</b>	<b>1,194</b>	<b>2,190</b>	<b>3,185</b>	<b>3,982</b>
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<b>Estimated savings for the population of England</b>					
	<b>246</b>	<b>1,486</b>	<b>2,778</b>	<b>4,121</b>	<b>5,270</b>
Estimated savings per 100,000 population	0	3	5	7	9

## 5 Implications for commissioners

- 5.1 Diverticular disease falls under programme budgeting category 13B Lower GI.
- 5.2 Implementing the recommendations in this guideline will result in savings for commissioners because of the reduction in tariff for treating acute diverticulitis, a lower cost procedure for treating perforation of the bowel and the reduced need for stoma care.
- 5.3 There may be additional costs for providers from an increase in the number of contrast CT scans that may be carried out.

## **6 Other considerations**

- 6.1 For people with suspected complications of acute diverticulitis referred for urgent same-day hospital assessment, the committee agreed that less costly clinical tests of full blood count and C-reactive protein (CRP) should be offered initially to identify inflammation. This could inform the decision making and help decide which patients should undergo further investigation for acute diverticulitis.

Full blood count and CRP are routinely used to assess for inflammation and indication of acute diverticulitis. This reflects current best practice but is not used across all NHS settings. Therefore, implementing this recommendation may mean a change in practice for some providers.

- 6.2 Evidence shows that performing a CT scan can reduce the use of subsequent endoscopy. CT scans are used to confirm diagnosis in people with acute diverticulitis. They would decrease the use of endoscopy, which is currently used to confirm the presence of diverticula or exclude other diseases such as cancer.

## **7 Sensitivity analysis**

- 7.1 There are some assumptions in the model for which no empirical evidence exists, so we cannot be as certain about them. Appropriate minimum and maximum values of variables were used in the sensitivity analysis to assess which variables have the biggest impact on the net saving. This enables users to identify the significant cost drivers.

Appendix A is a table listing all variables modified. The key conclusions are discussed below.

- 7.2 The savings set out in this report are highly sensitive to the rate of implementation of contrast CT scans. The assumption in this report



is that 90% of people in future practice will have a contrast CT scan. If the future contrast CT scan rate is 85%, the estimated savings from implementing the guideline will be £4.5 million and if the future contrast CT scan rate is 95%, savings from implementation are estimated to be £6 million for the population of England.

7.3 The savings are also highly sensitive to the current number of contrast CT scans that are carried out. The assumption in this report is that 60% of people currently have a contrast CT scan. If the current contrast CT scan rate is 50%, the estimated saving will be £6.8 million and if the current contrast CT scan rate is 70%, savings will be £3.8 million for the population of England.

## Appendix A. Results of sensitivity analysis

Individual variable sensitivity	Baseline value	Minimum value	Maximum value	Recurrent resource impact			Change (£000s)	Sensitivity ratio
				Baseline resource impact (£000s)	Minimum resource impact (£000s)	Maximum resource impact (£000s)		
<b>Current</b>								
Current uptake of CT scanning for people with acute diverticulitis in hospital	60.00%	50.00%	70.00%	-5,270	-6,788	-3,752	3,036	0.67
Current resection rate for people with bowel perforation	90.00%	85.00%	95.00%	-5,270	-4,626	-5,914	-1,288	0.85
<b>Future</b>								
Future uptake of CT scanning for people with acute diverticulitis in hospital	90.00%	85.00%	95.00%	-5,270	-4,511	-6,029	-1,518	1.00
Future resection rate for people with bowel perforation	80.00%	70.00%	90.00%	-5,270	-6,558	-3,982	2,577	0.75

## About this resource impact report

This resource impact report accompanies the NICE guideline on [Diverticular disease](#) and should be read in conjunction with it. See [terms and conditions](#) on the NICE website.

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