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## **Exploring attitudes and knowledge of climate change and sustainability in a dental practice: A feasibility study into resource management**

### **Abstract**

#### Objective

To understand the attitudes and behaviour of staff in dental practice towards adopting a reduce, reuse, recycle approach to resource management

#### Design

The qualitative aspects of a mixed methods study

#### Setting

The site for the study was a mixed NHS / private dental practice in North Devon.

#### Subjects

All disciplines from one dental practice

#### Interventions

- (1) A practice scoping exercise – provided context and identified an interview sample
- (2) Qualitative interviews with practice staff –to assess current knowledge in the practice and opportunities and limitations in relation to procurement and the management of resources

#### Results

Staff concerns centred around the amount of waste generated but recognised that this was in response to strict infection control guidelines. There was a strong desire to implement changes but deep concerns were expressed about the impact of challenging current guidance

#### Conclusions

Primary Care Dentistry provides both surgical and non-surgical care to more than half the UK population. Therefore lessons learned from General Dental Practice can encourage positive change. More research is needed across dental practice in order to generalise these findings



## **Exploring attitudes and knowledge of climate change and sustainability in a dental practice: A feasibility study into resource management**

### **Objective**

Primary Dental Care services form a significant element of NHS provision; in England these cost in the region of £3.6bn per year<sup>1</sup>. Primary Care Dental practitioners provided 39.8 million courses of treatment in 2013/14<sup>1</sup>. The reach of dental services is considerable with 29.9 million patients being seen over the 24 months up to June 2014 (56% of the total population)<sup>2</sup>. There is increasing emphasis on infection control and quality of care in dental practices, however, the wider impact of this focus in Primary Dental Care services, particularly in relation to the environmental impact, remains poorly understood and is rarely investigated. Dental practices use a more extensive variety of materials and instruments than many other health care services which adds unique aspects to our investigations.

There are certain general environmental regulations that apply to any business (including dental practice) in the UK<sup>3</sup>. Moreover, dental practices (similar to other businesses) are encouraged to take a socially responsible approach to the delivery of health services. A few years ago, primary care dentists requested an evidence review about how to minimise the environmental impact in their practice<sup>4</sup>. The evidence review did not identify any well-conducted studies which evaluated the environmental sustainability of dental practices nor what lead to unsustainable practice<sup>5</sup>. Despite increased interest in this topic, there is a clear uncertainty around the nature of problem, factors contributing to it and best approaches to address them.

This paper reports the qualitative aspects of a mixed methods study to explore approaches to sustainability in one dental practice, with a number of dentists, in North Devon. We collected data on the management of the dental practice along with interviews with all the staff in the practice. This provided context information for the second quantitative part of the study where we piloted and evaluated an innovative approach to conduct a waste audit. These results are described elsewhere.

The qualitative findings provide an opportunity to understand the best approach to study sustainability in a dental practice and the relation of behavioural and organisational issues to the results of the waste audit. The methods tested provide a template to provide more generalizable recommendations should they be repeated in other health care settings.

## **Design**

To collect contextual data about the attitudes and behaviour of staff in dental practice to understand the issues to adopting a reduce reuse recycle approach to resource use

We collected qualitative data to get a more in-depth understanding (Pope and Mays, 2009) on the barriers to, and potential for, sustainable resource management in a dental practice.

The data collection was in two parts:

- (1) A practice scoping exercise – provided context to the study and identified an interview sample representing all staff employed by the practice;
- (2) Qualitative interviews with practice staff –to assess the current knowledge in the practice and the opportunities and limitations in relation to resource management.

These methods have been tested in recent research by the Sustainability Society and Health Research Group (SSHRG) at Plymouth University on NHS procurement<sup>6</sup>.

## **Setting and subjects**

The site for the study was a mixed NHS / Private dental practice in North Devon. For the interviews and to ensure maximum variation in the sample all members of the practice from all disciplines were invited to take part. Table 1 provides an overview of the staff who agreed to be interviewed. The male/female mix is a reflection of the staff in the practice; there being many more females than males employed.

## **Insert Table 1 sample for qualitative interview**

### *Ethical approval*

Activities took place using the code of practice for research developed through Plymouth University's Faculty of Health and Human Sciences Research Ethics committee. All data collected was anonymised to protect the participants and maintain confidentiality. Patients were aware of researchers in the building.

### **Interventions**

Staff were fully informed of the details and purpose of the project. An information sheet was provided to all staff with contact details should they need further information from the researchers. The researchers visited the practice to discuss with practice staff dates, times and processes and to clarify that the information gathered was not focussed on individual behaviour but on how to improve learning in the practice.

A reflective log noting any issues that impact on study design or practical issues of data collection was maintained throughout the study period. This was used to make any necessary revisions to inform a possible larger study involving diverse dental practices.

To gather background and context information a scoping exercise was undertaken to collect data about the practice.

### **Insert Table 2 questions used in the scoping exercise**

Semi-structured qualitative interviews using a topic guide, which was developed as a result of the scoping exercise and previous research <sup>7</sup> were carried out with members of the practice from different disciplines exploring:

- a) Individual attitudes towards climate change and the need for sustainable behaviours

## b) The opportunities and limitations for sustainable dental practice

Prior to the interviews participants signed a consent form. All names were changed to protect the participant's identity. All data were stored on a password protected computer. Interviews lasted between 30-45 minutes and were digitally recorded. First the participants were asked two questions about their knowledge and understanding of climate change and sustainability and then specific questions were asked about their behaviour in the practice, and they were encouraged to raise any concerns or ideas they had about these issues.

### *Data analysis*

Thematic content analysis<sup>8</sup> was used to analyse the transcripts from the qualitative interviews with practice staff. Initial codes were identified by repeated reading of the transcript. Codes were discussed in a project meeting and a framework developed to allow for further analysis.

### Minimising the risk of bias

The focus of the study was the use and disposal of dental consumables and not an examination of treatment so the potential for bias was reduced. All data was thematically analysed and coded by 2 members of the research team. An audit trail was kept for all aspects of the project.

## **Results**

### Part 1: scoping exercise

Both quantitative and qualitative data were collected. The quantitative data concerned the number and type of staff; the number and types of clinical sessions; demographics and mission statement and the financial cost of materials and waste removal. Of relevance to this study was that since 2010:

- Turnover increased by 13% but profitability decreased by 3%  
Overall expenses increased by 18%  
Material costs (including consumables) increased by 14%
- Waste removal costs increased by 58% (*predominantly due to increased production*)

The practice manager and one dentist were asked about how decisions were made in the practice with regard to materials purchasing and waste management:

*Purchasing* – historical purchasing from a suppliers list;

*Decision making* – Decisions are affected by the training, experience and the perception of clinical need of the clinicians. The practice manager provides a summary of the direct and indirect costs and material usage. Monthly ordering enables strict stock control and reduces waste from items going out of date;

*Current waste arrangements* - Policies are written by the dental nurses who manage the waste. Once the stock arrives the cardboard waste is removed first and sent for recycling. Clinical waste is removed at the end of each and general waste is left for the council waste collectors;

*Training* - All staff have mandatory training annually (e.g. hand washing, waste management). Bi-monthly training sessions and every six months Basic Life Support (BLS) Medical emergency training;

*Meetings* – Bi-monthly clinical meetings; monthly partnership meetings.

Part two: Qualitative interview results

The interviews contained two sections. First all participants were asked about their knowledge and attitudes toward climate change and sustainability. **Previous research carried out by the NHSSDU (now SDU)<sup>10</sup> suggested that health services should aim to achieve ‘Values (that) are redefined to encompass health and wellbeing linked to an acceptance of finite resources’.** Current opinion focuses on the need to manage resources through a reduce, reuse recycle approach. It seems that identifying increased and more frequent extreme weather events as the result of climate change or using the word sustainability has created uncertainty with the tendency to inaction as a result. We were interested in ascertaining whether approaches to sustainable resource management were motivated by either, a general understanding of the link between the overuse of vulnerable materials and the resultant effect on climate, or whether staff simply followed rules without considering the reason why vulnerable materials needed to be managed. The participants interviewed for this study expressed a range of attitudes from interest to

**denial and some participants had decided to avoid resource management because of the lack of a uniform approach and clear guidance.**

In the second section questions focused on insights into the interest, willingness and motivations toward potential behaviour change. The results presented here do not have identifiers attached because of concern about confidentiality in such a small participant group.

*Section one:*

*Attitude to climate change*

The participant responses in this study reflected the range of negative to positive attitudes previously noted in the general <sup>10</sup>. For example:

*'I don't really know not convinced one way or another'*

*'We are not in touch with our natural roots anymore living in houses that are heated'.*

**Those whose attitudes are reflected in the first quote tended to be uninterested or unconvinced about the links between climate change and its link to resource management whereas those with a commitment to the natural environment related their resource management at home to that at work and were very aware of the link.**

*Sustainability*

Most participants recycled the waste required by the council. Some felt that they needed more information about what and how to recycle at home. A few participants grow their own vegetables and bring the surplus to work to share. These participants were the most concerned about climate change and the need to live sustainably. All participants were asked about their motivations for recycling at home and the responses were related to their interest in sustainability



*'We have a compost heap and recycle cardboard and all the usual things and I have pigs. They are great at recycling! ... we have chickens. I do it because its normal and I don't like waste'.*

*'Because I have to - I don't really think about the environment really and I am naughty sometimes'.*

Current opinion focuses on the need to manage resources through a reduce, reuse recycle approach<sup>10</sup>. Participants were also asked about why some people did not recycle. Some said:

*'People don't think where the waste is going as long as it's gone from their house in a black bag they don't think about it.'*

Whilst others had decided to avoid to ignore advice because of the lack of a uniform approach and clear guidance.

*For some people it doesn't matter and they don't see the effects.*

*Section two:*

*Opportunities and limitations for sustainable practice*

All the participants were aware of the recycling of paper, cardboard and plastic that takes place at the practice although some had no idea what happened to it when it left the practice. There were also conflicting views about the degree to which recycling was discussed with some saying it was discussed and decisions made whilst others said it was never discussed. This suggests that people who do recycle discuss the issue and those who have no interest are not engaged in the conversation.

There were several key issues that emerged from the transcripts:

*Conflicting guidance*

In a qualitative study conducted with health service managers <sup>11</sup> participants described their concern and confusion about guidance in relation to clinical waste and indicated their frustration where infection control policies seemed to conflict with waste management. In this study regulations which directly relate to the practice of dentistry had a profound influence on the behaviour of the staff, and this was most evident in relation to infection control <sup>9</sup>. The senior staff voiced frustration at the perceived burden of unnecessary regulation, but recognised that despite their protestations they had little alternative but to comply.

*'We do try to change it [how the guidance is prepared], we don't get anywhere but you do have to try. There was quite a lot of resistance to HTM01-05 to begin with but that didn't seem to make any difference. I would hope we can change it.'*

The senior staff recognised there was confusion and blamed the guideline's lack of flexibility and clarity:

*'HTM01-05 is a best practice guidance document but three people can read it and come up with six different ideas'.*

More junior staff described how they just follow the procedure. They might think that there was unnecessary waste but the concern about audit and preparation for audit visits was tangible:

*'I am only getting information from a book and I don't know if I am doing it right. It would be so nice to know how we can reduce our clinical waste'. The clinical waste is always an issue because we haven't the space to store it.*

More specific confusion related to the fact that everything in the practice rooms was considered clinical waste (**including paper forms, sterile wrapping and tissues not used in treatment**) despite the fact that there might be potentially infectious material outside the rooms too:

*'Anything that leaves the clinical area has to go into clinical waste so that if I blew my nose that tissue would have to go into clinical waste whereas at home I'd just put it in the bin. I don't get the difference'.*

It was explained to the researcher that the reason why everything was treated as clinical waste was because of the potential for contamination through droplet infection.

*'So in theory you shouldn't have a fan when it's hot in summer because that is moving the contaminated air around and everything that contaminated air comes into contact with is in theory therefore contaminated and therefore should be treated as clinical waste'.*

When asked about the reasons why staff followed orders and didn't question potentially unnecessary behaviours the responses were clear:

*'Fear of 'getting it wrong' – When we had the CQC (Care Quality Commission) come round I was absolutely bricking it'.*

As in previous research<sup>11</sup> information about what constitutes clinical waste was often provided by the waste contractors themselves. There may therefore be a perverse incentive amongst some waste contractors to encourage the use of clinical waste bags over more economical forms of waste disposal.

There also seemed to be confusion amongst staff about when to wear non sterile gloves and how they should be disposed of. For example in the sterilising room there was awareness of the need to avoid unnecessary cross contamination:

*I get through so many gloves. I don't touch any clean instruments after I have touched dirty so I have to think about how I do things.*

In other areas staff commented that they put on gloves '*automatically*' for every task from cleaning to treatment. The confusion seemed to come from how to dispose of gloves appropriately when they had been used:

*Everything that goes into a surgery goes to clinical waste except things like our boxes from our gloves we recycle them not in clinical– they contradict themselves massively. If I dry my hands on a towel in the surgery it goes to clinical waste but if I use one upstairs in the bathroom it goes to general waste.*

#### *Ideas for change*

Staff had various areas they wanted more information on and more opportunity to discuss current practice:

*'I think there needs to be a discussion to get things into perspective e.g what is the risk of cross contamination from two metres away if it goes into general waste. What is the risk to the general public?'*

The bagging of instruments was a particular area of concern and participants felt they would like to challenge current procedure in the practice. Evidence for the amount of waste produced because of repeated bagging of instruments is shown in the waste audit results (published elsewhere). Reduction in bagging could have a significant effect on the amount of **waste paper and plastic wrap** produced from each treatment session and would have a significant impact on staff time costs.

*'I would like some independent person to come in and say these things need to be bagged and these things don't need to be.'*

There was also general concern about the amount of cardboard that arrived at the practice and one participant felt it could be managed better in collaboration with the suppliers:

*'They could send it in crates that we would send back the following week and pick up the wrapping at the same time.'*

There was a degree of enthusiasm for gaining a green credential for the practice but ultimately the sense of being constrained and almost oppressed by the infection control guidelines and the CQC meant that until they were provided with new

information about what to do when, or encouraged to challenge how the guidelines had been written, the status quo would be maintained and reduce individual autonomy in practices.

## **Conclusion**

The role of Primary Care Dentistry in providing both surgical and non-surgical care to more than half the population means that any lessons learned from General Dental Practice **have the potential to highlight areas which might impact resource management**. In addition, this could provide a useful starting point for translation to a wide range of other health service settings.

Various strategies can be implemented to support a more environmentally sustainable approach within dentistry by embracing the 3 R's – Reduce, Reuse and Recycle. One of the specific areas highlighted repeatedly within the interviews, was the amount of sterile wrapping being thrown in clinical waste bags. It was generally assumed that this situation was generated by the introduction of the HTM01-05 infection control guidelines<sup>9</sup>. The interview study identified a strong desire to implement changes but deep concerns were expressed by the staff about potentially undertaking actions to reduce waste within the clinical setting. This was related to the concerns over audit<sup>1</sup> and the potential for being the '*one who let the practice down*' should an individual be identified for not having followed guidelines. **At no point in the interviews was there an indication that there was a lack of awareness of current infection control guidelines. What appeared to be concerning was how those guidelines were interpreted by some members of staff despite having discussed them with the Care Quality Commission Directly. Contradictory messages came from the CQC audit visits and from the waste removal contractors.**

Staff talked of their confusion and anxiety and this was true of all grades both clinical and administrative. It is suggested that this issue needs to be reviewed with some urgency and either sterile packaging is removed prior to treatment being started and therefore discarded in a general waste bag, or use re-usable packaging which can be re-sterilised at the end of the treatment session.

Clear guidance is also needed on when and how gloves are really needed. As the interviews suggested that gloves were put on 'automatically' for every task from cleaning to treatment. An awareness and understanding of appropriate glove use would enable a further reduction in waste. This need to 'think before you act' is also

valuable in the use of paper tissues which was mentioned in relation to their disposal inside and outside the clinical areas. All paper tissues that come into contact with body fluids must be disposed of in the clinical waste bin but tissues used for general cleaning may not need to be and regular discussions amongst practice staff which lead to jointly made and agreed decisions may allay some of the current anxiety. This is an area explored in greater detail through a study on waste audit published in a subsequent article.

There are few manufacturers offering 'green' products, so carbon reduction can be achieved by accessing products with fewer travel miles. Dentists could work with manufacturers to identify more re-useable products; increasing demand may prompt the manufacturers to identify further products which could be produced more sustainably. Negotiations about a reduction in packaging is also seen as essential and, as suggested by one member of staff, manufacturers could remove the cardboard on delivery or deliver items in re-useable plastic crates.

Based on the findings from the scoping and qualitative interviews the following steps, specifically related to the dental practice used in the study, are recommended:

1. Review current purchasing and identify whether some items could be bought closer to the practice
2. Work with local manufacturers to improve packaging
3. Encourage discussion amongst staff about internal processes
4. Invite infection control experts and waste management companies together to discuss safe working practices
5. Revisit the interpretation of current guidance about all items inside treatment rooms being regarded as clinical waste
6. Reduce packaging of sterile instruments
7. Reduce tissue and glove use

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## Declaration of interest

There are no conflicts of interest

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