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IN BRIEF

- The remand prison population represents 18% of the total prison population in the UK.
- Remand prisoners have compromised general and oral health compared with the general non-prison population.
- Remand prisoners exhibit high levels of mental illness and infectious disease.
- Poor oral health presented with high levels of decay and low levels restorative treatment.
- Non-healthy behaviours such as recreational drug use, tobacco smoking, alcohol consumption, and diets high in sugar content were commonplace.

Oral health of remand prisoners in HMP Brixton, London

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Overview This study investigated the general and oral health status and behaviours and the dental treatment requirements of remand prisoners. It makes recommendations on how their oral health care needs may be met.

Method A convenience sample of 78 remand prisoners participated in the study within HMP Brixton. The study involved a structured interview, to establish health status and behaviours as well as perceived oral health needs, combined with an oral examination to establish normative treatment need.

Results Prisoners' general health was compromised. In particular, there were high levels of mental illness and infectious disease. Unhealthy behaviours such as tobacco smoking, alcohol use, drug dependency, and high sugar diets were commonplace. This affected the remand prisoners' oral health, which presented with high levels of decay and relatively low levels of both missing and filled teeth. Whilst prisoners made high use of prison dental services, they made little use of dental services outside of prison. The high turnover of remand prisoners and high demand for emergency care made the delivery of preventive and routine care difficult.

Conclusion Remand prisoners have compromised general and oral health compared with the general population. They exhibit poor oral health, which is contributed to by their lifestyles and health behaviours.

INTRODUCTION

There are few published studies on the oral health of prisoners. Available studies report that prisoners have poorer oral health than the general population, and remand (short stay) prisoners usually present with both poorer general and poorer oral health than convicted prisoners.

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The remand prison population consists of two groups of prisoners – those awaiting trial and those who have been convicted but not yet sentenced.[1] In 2002, 18% of the total prison population in England and Wales was on remand, the majority of which were men (93%) aged 21 and over (77%).[2] Fifty percent of them went on to receive custodial sentences.[2] Remand prisoners are usually imprisoned in local prisons or remand centres, with the London area holding 39% of the total remand prisoner population in the UK.

Prisoners come predominantly from the lower social classes with fewer educational qualifications, less work experience, and poorer housing conditions (with many of them being homeless at the time of imprisonment) than the general population. People from social classes IV and V are not only less likely than the general population to use preventive health services (such as screening, immunisation, and health advice), but they are also more likely to practice health damaging behaviours such as smoking, drinking and recreational drug use that contribute to poorer oral and general health.[3]

People from lower social classes show a tendency towards irregular dental attendance and are more likely to visit the dentist only when in pain.[4] This is substantiated by the *'Strategy for modernising dental services for prisoners in England'*, which highlights the high oral health needs and level of untreated dental disease of prisoners.[5]

AIM

The current study aims to:

a) Investigate the general and oral health status, dental treatment requirements and the general and oral health behaviours of remand prisoners in HMP Brixton, and
b) Make recommendations for how their oral health care needs can be met.

METHOD

In July 2004, Northern and Yorkshire Multi-Centre Research Ethics Committee approved the study to commence in HMP Brixton, London. It houses a mix of remand and convicted inmates and can maintain a population of 805. It has a high

turnover of prisoners due to the large number of new daily receptions (13 to 18 per day), and the fact that remand prisoners (who comprise 50% of the prison population) stay an average of only 35 days.

Sample selection

A cross-sectional study of remand prisoners was planned but proved not to be possible, as prisoners were unwilling to participate in the study unless dental treatment was offered. Consequently, despite the bias that might be introduced, it was decided to modify the recruitment process and utilise a convenience sample of remand prisoners so that the study could proceed. All remand prisoners attending the prison dental services between October 2004 and March 2005 were invited verbally to participate. In return they were provided with appropriate, necessary dental treatment that was in accordance with the 2003 Department of Health guidelines for the provision of prison dental treatment.[5]

Main study

All participants completed a structured interview before undergoing an oral examination. Both were carried out in the prison dental surgery by the researcher (EH).

A questionnaire covering the areas of perceived oral health and general health status, past dental attendance and treatment, oral and general health behaviours, and socio-demographic information was developed. The questionnaire was piloted with seven prisoners who were excluded from the main study. It was administered as a structured interview in order to overcome any literacy issues amongst the study group.

The oral examination was used to establish the normative treatment need of the prisoners. It investigated oral mucosal pathology; prevalence of decayed (D), missing (M), and filled (F) teeth; and periodontal status. The criteria used for DMFT were in accordance with those of the 1998 Adult Dental Health Study.[6] Periodontal pocket depths were measured at two sites (mesial and distal) for every standing tooth.

Data analysis

Data analysis took place using standard statistical tools (STAT 8, STATA Co, TX, USA). All statistical analyses were performed using non-parametric tests.

Intra-examiner reliability was assessed using the Kappa score obtained by re-examining one in ten of the original sample and comparing the results with the original examination data for the same subjects. Repeat examinations took place at no less than one week and no more than four weeks from the first examination.

RESULTS

All the prisoners who were approached, following the decision to offer necessary dental treatment to participants, agreed to take part in the study. This gave a response rate of 100% following adoption of the convenience sampling. However, one person who completed the interview did not feel able to take part in the examination, giving a participation rate of 98.7% for the oral examination.

Demography

The study population comprised 78 remand prisoners. The mean age of the sample was 35.7 (SD ± 9.6) with 70% of people in the 19-34 year age group. Four participants (5.2%) declined to declare their ethnicity. Of the 74 (94.8%) people who chose to disclose their ethnicity, 30 stated Black, 27 White, five South Asian, four Chinese and eight Other. 'Other' signified people of Turkish and mixed ethnicity.

The majority of the subjects (64% [50]) were unemployed prior to arrest and 58% of them (29) received state benefits for either sickness (temporary or long-term) or disability. Although there were high levels of unemployment in the study group, 36% (28) declared a 'usual' occupation. The most common previous employments were given as: building industry worker, painter or decorator, and working within the catering business. Fifty percent (39) of the respondents claimed to have educational, professional, vocational or other work-related qualifications.

General health

The majority of people (86% [67]) were registered with a general medical practitioner (GMP), and 36% (28) of the participants stated they had received treatment from a hospital specialist. Relatively few people (10% [8]) reported difficulties registering with a GMP.

Overall, the study group perceived their general health to be good (50% [39]). Twenty-seven percent (21) perceived their general health as 'OK', 13% (10) perceived it as poor, and 6% (5) as bad/very poor. Three people (4%) were uncertain how to describe their health status. The medical reasons given by prisoners for assessing their health as poor are set out in Table 1.

Fifty-nine percent (46) of the study population believed they had experienced depression. Asked separately about mental illness, 15% (12) reported experiencing this state.

Health related behaviour

Possible factors contributing to prisoners' poor general health were further investigated by asking questions about health damaging behaviours.

Alcohol: Most people (84% [66]) reported alcohol consumption prior to imprisonment. Fifty percent of these people (33) consumed more than the male maximum recommendation of 28 units per week. Seventy-five percent (25) of this group drank heavily (>50 units per week). The mean number of years of alcohol consumption was 11 (SD ± 9.3) with a median of 10 years (interquartile range [IQR] 4-16).

Tobacco smoking: Seventy-eight percent (61) of the participants reporting smoking tobacco. On average, they smoked nine roll-ups a day (SD ± 6.7; median 10, IQR 4-13) for 15 years

Table 1 Reasons for perceiving general health as poor

Condition	% (number) of study population affected
Diabetes	6 (5)
Cardiac problems	4 (3)
Infectious conditions	15 (11)
TB	3 (2)
Hepatitis B	3 (2)
Hepatitis C	8 (6)
HIV	1 (1)

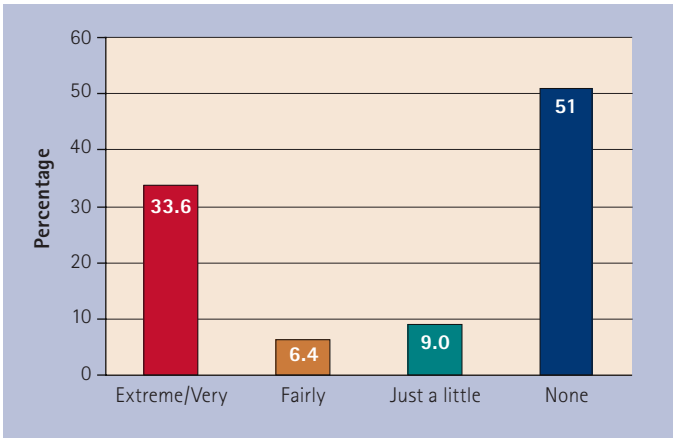

Fig. 1 Degree of perceived dental anxiety

(SD ± 10.9; median 15, IQR 9-20). Of the remaining 17 non-smokers, nine were past smokers.

Drug use: Eighty-three percent (65) of participants admitted to using illicit drugs. Cannabis was smoked by 55% (36), and the main opiate of choice was cocaine (66% [43]). Other opiates were less frequent amongst the prison population – heroin 39% (25), methadone 13% (9), and crack cocaine 12% (8).

Sugar consumption: The participants reported a high number of sugar intakes from snacks and drinks in between meals. The mean number of sugar intakes per day was 9.8 (SD ± 8.3; median 8, IQR 5-12).

Oral health attitudes

The participants reported that they valued their teeth highly (99% [77]). The main reason given was mastication/function (40% [31]). The importance of teeth both from a social (smiling, talking and working) and aesthetic perspective was also mentioned (12% and nine people in both cases).

Asked if they would prefer an aching back tooth restored or extracted, 45% (35) of the sample preferred restoration and 28% (22) extraction, with the remaining 23% (18) uncertain. When it came to an aching front tooth, the number preferring restoration rose to 68% (53). Those opting for extraction fell to 15% (12) and those who were uncertain to 17% (13).

Forty-nine percent (38) of the study population reported anxiety about visiting the dentist. Their levels of anxiety are shown in Figure 1. The main reasons for feeling anxious were the fear of having an injection in the mouth and the use of the drill. Forty-five percent (35) of the sample admitted to disliking intra-oral injections. Other factors given for not visiting the dentist were apathy, laziness and lack of time.

Oral health related behaviour

The majority of prisoners (73% [57]) claimed to have visited the dentist during the last year. Principally, their most recent dental visit was in prison (54% [31]). However, people also reported having used NHS dental services (32% [18]), private dental care (6% [3]) and hospital clinics (5% [3]).

Sixty-seven percent (52) of prisoners' last dental visit had been because of pain, swelling, infection or trauma. A further 12% (9) gave check-up as the reason for their last dental visit and a similar percentage had last visited the dentist for routine treatments, such as scale & polish and restorative care.

Seventy percent (55) of the prison population reported brushing their teeth twice daily even though the overall opinion of the prison issue toothbrush and toothpaste was that they were substandard.

Table 2 Dental status in remand prisoners

Dental status	Remand prisoners		Adult Dental Health Survey (ADHS) 1998
	Number of teeth (28)		Number of teeth (32)
	Mean (± SD)	Median (IQR)	
Sound	13.8 (7.5) [17.8 if 3rd molars included]	15 (8-20)	15.7
Decayed	3.5 (2.7)	2 (2-5)	1.0
Missing	6.2(7.6)	2 (1-8)	7.2
Filled	4.5 (7.5)	3 (1-7)	8.1
DMFT	14.2 (7.5)	13 (8-20)	16.3

Oral health

Perceived need: The majority of prisoners (71% [55]) perceived their oral health as poor and felt that they were in need of treatment. Thirty-five percent (19) felt that either broken teeth or toothache contributed to this status. Nineteen percent (15) of the study population felt that they had a healthy mouth and 9% (7) were uncertain of their oral health status.

Normative need: Although the prisoners reported good oral hygiene procedures, plaque levels were high with a consequence of periodontal disease. The mean number of probing sites* that bled was 25 (± 29). The mean number with visible plaque was 44 (± 27); with pocket depths of 4-6 mm was 39 (± 31); and with pocket depths of >6 mm was 2.5 (± 3). The restorative treatment needs of the remand prisoners were high, with a tendency not to receive restorative treatment as seen from the decayed (D), missing (M), and filled (F) components of the DMFT scores in Table 2.

Intra-examiner reliability: The Kappa score for this study was 0.71, indicating good intra-examiner reliability.

DISCUSSION

Bias in the study

This could have been introduced by a number of factors:

I. **The convenience sample –** the low response rate seen before any incentive to participate in the study is in accordance with the findings of Maden *et al.*[7] They reported that participation is usually hampered by the high turnover and short duration of stay of prisoners in remand centres and local prisons. HMP Brixton falls into both these categories. Whilst the results of this study give an indication of the oral health needs of the remand prison population, they may overstate both the normative needs and the perceived needs of the whole prison

*NB: for all periodontal parameters there were two recording sites, medial and distal, per tooth.

population in favour of people who were interested in obtaining access to dental treatment. The study participants were aware of their oral health status and expressed high perceived needs for dental treatment (71%). This aligned with their high normative need. There are no previously published studies that consider both perceived and normative needs of remand prisoners. However, Williams *et al*. describe perceived need, and reported higher proportions of perceived needs than in the current study (89%), suggesting that the current findings are not excessively high for a remand prison population.[8]

II. **The use of a structured interview rather than a questionnaire** could inhibit the disclosure of sensitive information, such as recreational drug use. However, the researcher (EH), who has worked with young offenders and prisoners for two and half years, has found that prisoners are generally willing to disclose such information. The use of the structured interview was selected in order to avoid literacy problems, which are high in this population.[9] A high proportion of prisoners (91% [71]) in this study found the interview format helpful, even though only a small proportion (10% [8]) reported being unable to read. This may indicate that the problem was greater than declared and that people prefer to hide this disability due any possible related stigma.

III. **The researcher being the main dental service provider** at HMP Brixton may have led to an increased '*halo effect*'. An example of this could be the high proportion of people (99%) who said that they valued their teeth highly. This might be supported by the fact that 28% of them would prefer to have a back tooth extracted rather than restored. Whilst this might reflect levels of anxiety related to having teeth drilled, it is likely that it reflects an effort to please the researcher by telling her what they thought she wanted to hear. However, the findings of the current study (where prisoners were predominantly young, black, males, with low educational qualifications, and unemployed prior to imprisonment) are in line with those of Bradnock *et al*.[4] who found 34% of adults from the lower social backgrounds would opt to have an aching back tooth removed compared with 13% for the higher social classes.

General health

On the whole, the health of the study population was poorer than that of the general population. The prevalence of diabetes was the same as that for the male population of the most deprived areas in England and Wales.[10] Levels of infectious diseases (hepatitis B [3%], hepatitis C [8%] and HIV [1%]) were higher than in the general population. The Department of Health stated that the risk of contracting hepatitis B and C infection was increased amongst people with a history of imprisonment, intravenous (IV) drug use and who had also lived in the London area.[11] These three circumstances apply to a high proportion of the remand prisoners in this study, of whom 17% have used IV drugs, 45 % live locally, and 55% have a previous history of imprisonment.[12]

The high levels of mental illnesses (15%) and depression (59%) reported by the study participants are lower than the findings of Maden *et al*., who found that 88% of remand prisoners had mental illnesses with 55% of them needing immediate treatment and 9% of this latter group requiring NHS hospital admission.[7]

Health damaging behaviours

Health status can also depend on current and/or previous health damaging behaviours. A number of health damaging behaviours are recognised as part of the lifestyle of the majority of people who are sentenced to imprisonment.[13]

Alcohol: Half of the study group were considered to drink hazardously during the year prior to their imprisonment. However, HMP Brixton prisoners' hazardous alcohol consumption rate was only 17% of that reported for the general prison population.[14]

Tobacco smoking: A high proportion of the study population (78%) also smoked. Singleton *et al*. and Coulthard *et al*. had similar findings of 85% in a remand prisoner population.[14,15] They also found remand prisoners had higher smoking rates than both convicted prisoners (77%) and the general population (30%).

Drug use: This is known to be common amongst prison populations. Meltzer *et al*. found that just over half of remand prisoners (51%) reported dependency on recreational drugs.[9] In the current study, 83% of subjects admitted to the use of recreational drugs. However, dependency was not measured. The consumption of recreational drugs can lead to health damaging behaviours such as needle sharing and the risk of contracting infectious diseases. The psychological effects of recreational drug use include depression, anxiety, mental illness (schizophrenia, paranoid psychosis) and social maladjustment, and the daily life of people with drug dependency tends to be chaotic.[16,17] Chronic drug use may lead to oral neglect, suppressed appetite, altered taste, high sugar consumption due to cravings, and a tendency to snack rather than having meals. These factors compound to have an adverse effect on oral health. In turn, pain and discomfort from oral disease can lead to increased drug use.

Sugar intake: Whilst HMP Brixton advocates and promotes healthy food options at mealtimes and has added fruits and sugar-free drinks to their canteen list, the majority of prisoners opt for unhealthy and sugar-rich diet and snack options. The prisoners' choices are in line with Locker's belief that people from lower social classes are more likely to demonstrate unhealthy behaviours.[3,18] On average, prisoners reported 10 sugar intakes per day even though most of them acknowledged the tooth damaging effect of frequent sugar intake. Despite the use of fluoride toothpaste, this high sugar intake (mainly between meals) puts their oral health in jeopardy.

Prisoners justified their unhealthy lifestyle, particularly regarding sugar intake and smoking, as necessary to cope with the high stress levels in prison or the worry related to their forthcoming trial. Poor diet and low levels of exercise could be contributing factors to prisoners' poorer general health[3,18] and their high use of the GMP service both in and outside of prisons.[19] A prisoner's average mean annual GMP contact rate is much higher than for men in the general population (13 and three, respectively).[20]

Oral health

Prisoners' oral health, irrespective of their age, sex or prison status, has been reported as compromised.[21] Normative need is consistently reported as high[21-25] as is the perceived need in both the current study and the only other available study reporting it.[8]

Poor oral health has been related to drug habits,[26,27] dental attendance patterns,[4,17,28,29] attitudes to treatment[30] and, indirectly, to barriers to oral health care, such as being regarded as a 'high risk' patient.[29]

Oral methadone, which is commonly used as a prescribed alternative to opiates either as a substitute drug or as part of a withdrawal programme, is associated with increased caries risk.[30] The syrup-based methadone, generally prescribed because its high viscosity makes it less amenable to intravenous use, can lead to high levels of tooth decay and tooth wear.[30] Lunn *et al*. pointed out that some prisoners hold the methadone in their mouth for extended periods of time, either to enhance and increase its effect or for re-sale purposes.[23] In both situations, the lengthy exposure to this high-sucrose solution puts the dentition at increased risk.

The previous high levels of alcohol consumption (which are likely to be resumed on release from prison), coupled with tobacco smoking and recreational drug use in a relatively young male population (70% in the 19-34 year age group), makes this a high risk group for developing oral and pharyngeal cancer.[31]

Periodontal status: It is recognised that smoking contributes to periodontal disease and accelerates its progression by 10-27 years.[30,32-35] This is likely to be a contributing factor to the high levels of periodontal disease seen in this relatively young prison population. Although the majority of participants (70%) reported brushing their teeth frequently, they presented with higher plaque levels and deeper gingival pockets in contrast to at least one previous UK prison study.[36] The high proportion of moderate to severe periodontal disease seen in the current study could be the result of a combination of poor oral health and the subjects' health damaging behaviour such as tobacco smoking, the local effects of other drugs, and bruxism related to drug use (or its withdrawal) and high stress levels. The common alerting factor of bleeding gums, to early periodontal disease occurs less often in heavy smokers.[35,37] People who fall into this category (eg the majority of prisoners) and who are only using emergency dental services and, therefore, are not undergoing periodontal charting, may be oblivious to their advancing periodontal disease until troubled by loose teeth.

Dental status: The dental status of remand prisoners is shown in column 1 of Table 2. When compared with figures from the ADHS, subjects in the current study presented with more decayed, fewer sound, fewer filled, and fewer missing teeth than the general population.[6] However, the current study excluded third molars, whereas the ADHS results are based on a dentition of 32 teeth. If it was assumed that all study participants had four sound third molars, the number of sound teeth would rise to 17.8. This would have no effect on DMF components or DMFT. However, it is unlikely that all third molars would be sound or even present. Subsequently, even though the DMF of prisoners is higher than in the general population, this study presents an optimistic picture. The current study's findings corresponded with those of previous prison studies.[21-25,38]

However, studies of the USA prison population, reported by Salive *et al*. and Mixson *et al*, indicated higher numbers of missing teeth in prisoners in comparison with the general USA population.[24,25] These authors explained the higher rates of missing teeth amongst prisoners as a result of trauma during fights, and the type of dental care received. This may reflect a higher extraction rate and only using emergency dental services.[22]

Dental service use: The majority of study participants (67%) declared themselves to be irregular dental attenders using emergency dental services only. Their higher than average levels of decayed and lower than average numbers of filled and missing teeth in the current study were considered to be a reflection of not using dental services previously, due to either lack of access or postponement of treatment because of anxiety. It may also have been linked to a lack of awareness of dental pain during prolonged periods of drug dependency.

The high anxiety levels (49%) reported and observed in this study population are likely to be the result of a combination of factors, including: the realisation that they required treatment; previous dental experiences; a fear of injections; a concern that pain may not be adequately managed; and/or an inability to tolerate pain due to a low pain threshold during their detoxification programmes.[29]

Other factors such as deprivation, high mobility, and poor general health may also have contributed to their barriers to obtaining access to dental services. Cunningham *et al*. have suggested that prisoners' high levels of anxiety, mental illness, history of substance abuse, blood borne infections and backlog of unmet dental treatment undoubtedly make them a challenging group for whom to provide dental treatment.[22]

The current study and others have found that, somewhat ironically, prisoners make far more use of elective dental services in prison than they did outside, and they continue to make substantially less use of dental services outside prison establishments than do the general adult male population.[23] Indeed, the majority (54%) of this study populations' latest dental visit was during their previous conviction.

Prisoners' insight into their oral status leads them to make arrangements to see a dentist more frequently in a prison establishment than outside. This may be because they encounter fewer barriers to access.[23] Whilst there can still be long waiting times, the positive staff attitudes, absence of stigmatisation, and knowledge about prisoners' previous lifestyle and its implication on their general and oral health can make access easier. However, it may also be a reflection of prisoners having time to organise their lives without the distraction of other priorities.

Jones *et al*. point out that the DMFT of prisoners may be dependent on the length of time they have been in prison.[21] Generally, the longer stay, convicted prisoners have better oral health than the shorter stay remand prisoners. This is due to convicted prisoners making regular use of prison dental services.[23] Longer-term convicted prisoners also have the opportunity to take fuller advantage of healthy lifestyles (eg detoxification programmes, smoking cessation, healthy food options). Additionally, long sentences provide the opportunity

of some stability in life compared with multiple, short-term sentences which only add to an individual's chaotic lifestyle.

A whole team approach: Whilst there are limits on prison dental services, the provision of oral health promotion in a population with high consumption of sugary drinks and foods is likely to be challenging.[23] A whole team approach has been established in HMP Brixton. The researcher/prison dental officer (EH) is involved in the prison smoking cessation programme to improve oral health. At the request of the dentist the prison pharmacy now provides sugar free methadone for maintenance or weaning off opiate use. The canteen shop list has been revised and oral healthcare products (with the exception of floss), fruit, safe snacks and sugar-free drinks are now available. The HMP Brixton chefs have also reduced the amount of sugar in meals. However, it is convicted rather than remand prisoners who are most likely to benefit from this approach.

The Department of Health's recommendations[5] for short-term prisoners are pragmatic and concentrate on pain relief in the form of extractions and simple conservative treatment. This approach can be justified in local prisons with a high turnover of prisoners, where the majority of prisoners are on remand.

SUMMARY

The general and oral health of the remand prison population in HMP Brixton is compromised compared with the general population. Non-healthy behaviours such as tobacco smoking, alcohol consumption, recreational drug use and diets high in sugar content were commonplace. The high turnover of prisoners and the high demand for emergency care make the delivery of preventive and routine dental care difficult.

RECOMMENDATIONS

As the result of the study it is recommended that in order to address the oral health needs of remand prisoners:

- Dental screening is integrated into the 'on-arrival' medical screening or 'single assessment process' for remand prisoners, to identify the prisoners that require urgent referral to dental services
- Prison establishments should introduce oral health education programmes, with an emphasis on the oral side effects of recreational drugs and healthy eating
- Dental records are integrated into the newly introduced, centralised electronic system (eg EMIS). This will ease transfer of records and continuation of care between different prison establishments. Upon release to the community the prisoner can be provided with a printed copy of their continuing oral care needs.

Rationalisation of dental care focussing on short stay prisoners in urgent need of dental care would seem to be a sensible way forward. Additional treatment sessions and resources allowing more comprehensive care would require further investment.

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