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Identifying 'unknown diabetics' using geodemographics and social marketing

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Abstract

This paper reports on a pilot study of the use of geodemographic segmentation and social marketing to identify people at risk of the disease Type II diabetes within a primary care trust (PCT). Geodemographic segmentation data for all GB households were overlaid with UK NHS hospital episode statistics (2001–2002) to predict population groups at risk of Type II diabetes. 'At-risk' populations were then profiled within Slough and a targeted social marketing campaign was instigated to encourage those likely to be at risk of the disease but unaware of their symptoms to be screened. The marketing campaign focused on the predominant community most at risk, those South Asians within the Slough, PCT. Health professional and government attempts to date have been largely reactive to managing population disease burden. Chronic disease management has tended to concentrate on case management of only the very sickest patients. The debate is now shifting to a proactive stance: on earlier 'upstream' interventions with at-risk populations (those who are not yet sick and those who are sick but receive no treatment) to reduce long-term disease complications and improve health. This pilot study showed geodemographic data can be successfully overlaid with routine NHS data to identify people at risk of Type II diabetes. Coupled with social marketing techniques, a cost-effective and successful screening programme for Type II diabetes is achievable. Referral rates increased critically among those in the early stages of the disease, understanding of the condition was raised within the community and links between the local Asian community and the PCT were strengthened. Such frontloading of NHS resources into targeted interventions has potentially far-reaching repercussions for improving the quality of life of diabetes sufferers. The model has considerable potential for replication among other communities and for different medical conditions.

Introduction

Diabetes and disease management

In the UK, around 1.8 million people have been diagnosed with diabetes; 90–95 per cent of cases are Type II diabetics.¹ It is estimated another million — 'the missing million' — have the disease but are unaware of

this.^{2,3} The annual cost of the disease is £5.2bn — 9 per cent of the annual NHS budget.⁴

Diabetes

Early referral

The effective management of the disease is now a priority of the government's health policy. The Diabetes National Service Framework (2001) committed the NHS to 'develop, implement and monitor strategies to identify people who do not know they have diabetes'.⁵ Recent evidence suggests people with Type II diabetes have the condition for between nine and 12 years before diagnosis. A recent study showed half of all people diagnosed with Type II diabetes did not present until developing serious medical complications, such as kidney failure.⁶

Diabetes UK, the leading national diabetes charity, has been arguing for the early identification of people with diabetes for many years.⁷ Early identification is important as it can help reduce the impact of the long-term complications of the disease on the individual, helping keep people out of hospital. Undiagnosed diabetics are at risk of serious long-term medical complications, such as blindness, kidney failure and nerve damage. By frontloading NHS resources into screening at-risk communities early, the disease can be properly managed, potentially reducing the likelihood of long-term complications and ensuring that NHS resources are maximised.

Certain demographic types have a predisposition to developing diabetes; this is influenced by lifestyle factors and genetics. In the UK, diabetes is three to five times more common among people of African-Caribbean and Asian origin.^{8,9} Prevalence of diabetes in Asians over the age of 40 has been shown to be as high as 20 per cent.¹⁰

South Asians, despite their notable cultural and social differences, also have the unenviable distinction of achieving the highest death rates for coronary heart disease in the UK, with Bangladeshis being particularly disadvantaged.¹¹ Their heightened risk is probably attributable to a genetic disposition to Type II diabetes (four times that of Europeans),¹² and the early onset of the disease (about ten years earlier than in Europeans).¹³ Tackling those at risk of Type II diabetes therefore has implications for wider reductions in population disease burden.

Socially marketing health screening

The potential utilisation of social marketing techniques in public health promotion has increasingly been of interest to academics and health policy makers. The emphasis on prevention and health promotion and the close relationship between health and social marketing are central themes of the recent government white paper.¹⁴ *Choosing Health — Making Healthy Choices Easier* recognises that people need supportive environments within which to change behaviour, and that there is a need for individually tailored health improvement initiatives.¹⁵ The white paper further stresses the importance of context in an individual healthy lifestyle, acknowledging that socio-economic and socio-cultural factors, as well as peoples' own attitudes and beliefs surrounding good health, must be considered. The white paper may, in a sense, be viewed as a

Social marketing

marketing strategy which stimulates demand for accessible and credible health information.

Academics have suggested the 'social marketing paradigm' as the basis for a theoretical argument that marketing can be used as a positive force for better health.¹⁶ Lefebvre and Flora argue marketers are keen to influence consumer behaviour — in this case the need is to influence people to acknowledge medical symptoms and report earlier.¹⁷ Key components to the success of a social marketing campaign have been identified as identification of the key audience through segmentation and analysis; consumer orientation; voluntary and mutually beneficial exchange; formative research; clear objective setting; channel analysis; and a marketing mix of product, place, promotion and monitoring and evaluation.¹⁸

Geodemographics

Pivotal to the success of social marketing is the accurate segmentation of society.^{19,20} Geodemographic data can be applied to 'understand the consumer', permitting tailored behavioural interventions to be designed and allowing the formulation of strategy to decide where resources might be targeted to deliver health behaviour change using social marketing initiatives. While the language of public health discourse may not express it in these terms, the idea of 'market segmentation' is now increasingly commonplace in policy. In particular, there is a realisation that the reduction of health inequalities is dependent upon the engagement of 'deprived and marginalised' communities.

In this paper geodemographic data are overlaid with hospital episode statistics (HES) data recorded in 2001–2002 for Type II diabetes to generate detailed geodemographic profiles of population groups at risk of the disease within Slough. This analysis, and how these data were then used to inform a social marketing campaign in Slough to encourage those at risk to come forward and be screened for Type II diabetes, will then be discussed. This pilot was designed and implemented in conjunction with Slough PCT and sponsored by the Department of Health.

Research design and methods

A predictive, secondary data analysis was run using NHS HES of Type II diabetes for 2001–2002 with 61 appended geodemographic MOSAIC-type codes for all households in Britain at a postcode level within the catchment area of Slough PCT. The data were corroborated by using local datasets from sources such as the East Berkshire Diabetic Retinopathy Register, the Diabetes Centre and registers from local GP practices.

NHS HES for Type II diabetes 2001–2002

This dataset contains entries for 12.8 million overnight hospital admissions to all hospitals in Great Britain in 2001–2002. Each data record for admissions contains a diagnostic code indicating the health problem that necessitated an overnight stay in hospital. HES also record patient date of birth, ethnicity, PCT code, GP code, local authority code and postal code.

MOSAIC

MOSAIC geodemographic classifications for all GB households

MOSAIC is a commercial dataset licensed by Experian. It groups together households into clusters described according to their geographic and demographic characteristics. It is based on Census data and housing, financial and other population data. A total of 400 variables are used to build the clusters, and these are updated annually. These variables have been selected as inputs to the classification on the basis of their volume, quality, consistency and sustainability. In order to be included into the classification, data must meet one or more of four criteria. First, they must allow identification and description of consumer segments that are not necessarily distinguished solely by the use of Census data. Second, the data must ensure accuracy of the MOSAIC code by either household address or postcode. Third, the data must be current; and lastly they must improve discrimination of segments and allow for the identification of a wide range of consumer behaviours. Fifty-four per cent of the data used to build MOSAIC are sourced from the 2001 Census. The remaining 46 per cent are derived from a consumer segmentation database, which provides coverage of all of the UK's 46 million adult residents and 23 million households using the electoral roll, lifestyle survey information, consumer credit activity, post office address file, shareholders' registers, house price and council tax information and ONS local area statistics. MOSAIC classifies consumers by household or by postcode, which allows optimisation of use of the segmentation depending on application.

Procedure

The MOSAIC data are linked to the HES using a simple postcode link. To maximise the match rate the postcodes are forced across eight digits in each file. For example, W1 1AA becomes W__1_1AA. Where postcodes have changed a retrospective file is also held that makes it possible to update old postcodes which may have been entered on the HES file.

Results

HES for Type II diabetes were matched against geodemographic codes for the entire UK population. This paper reports on these data only for the catchment area of the Slough PCT. Table 1 shows the geodemographic profile of Slough by MOSAIC type.

Table 2 demonstrates the incidence of Type II diabetes by MOSAIC type. The MOSAIC geodemographic types of people with the highest indices have the most risk of developing Type II diabetes. An index of 100 indicates the UK average penetration of the disease. An index of 432 indicates an incidence of diabetes of 4.32 times the national average. The MOSAIC types with the highest penetrations of Type II diabetes (over 100) are, in order, 'Cared-for pensioners', 'Old people in flats', 'Sepia memories', 'South Asian industry', 'Bungalow retirement', 'Dignified dependency', 'Ex-industrial legacy', 'Low-income elderly' and 'Asian enterprise'.

Of note are the high indices attached to Asian geographic MOSAIC types. 'South Asian industry' has an index of 219 and 'Asian enterprise'

Table 1: Geodemographic breakdown for Slough PCT by MOSAIC type

	Slough	%	UK	%	Pen. %	Index	
	Population of Slough in each MOSAIC type		Population of UK in each MOSAIC type			Mean average index for Slough versus UK (100 = UK average)	
A Symbols of success							
01 Global connections	0	0.00	340,206	0.58	0.00	0	
02 Cultural leadership	12	0.01	569,707	0.96	0.00	1	
03 Corporate chieftains	543	0.45	774,087	1.31	0.07	34	
04 Golden empty nesters	282	0.23	813,753	1.38	0.03	17	
05 Provincial privilege	430	0.35	1,041,885	1.76	0.04	20	
06 High technologists	2,350	1.93	1,345,396	2.28	0.17	85	
07 Semi-rural seclusion	412	0.34	1,265,420	2.14	0.03	16	
B Happy families							
08 Just moving in	694	0.57	321,678	0.54	0.22	105	
09 Fledgling nurseries	4,593	3.77	707,526	1.20	0.65	315	
10 Upscale new owners	610	0.50	1,018,040	1.72	0.06	29	
11 Families making good	2,133	1.75	1,511,942	2.56	0.14	68	
12 Middle-rung families	4,138	3.40	2,063,265	3.49	0.20	97	
13 Burdened optimists	6,610	5.43	1,158,699	1.96	0.57	277	
14 In military quarters	0	0.00	135,823	0.23	0.00	0	
C Suburban comfort							
15 Close to retirement	1,368	1.12	1,875,500	3.18	0.07	35	
16 Conservative values	491	0.40	1,639,657	2.78	0.03	15	
17 Small-time business	182	0.15	1,781,396	3.02	0.01	5	
18 Sprawling subtopia	5,677	4.66	1,981,458	3.36	0.29	139	
19 Original suburbs	1,895	1.56	1,547,875	2.62	0.12	59	
20 Asian enterprise	25,303	20.77	776,569	1.31	3.26	1,580	
D Ties of community							
21 Respectable rows	6,069	4.98	1,449,283	2.45	0.42	203	
22 Affluent blue collar	172	0.14	2,000,876	3.39	0.01	4	
23 Industrial grit	921	0.76	2,359,262	3.99	0.04	19	
24 Coronation Street	198	0.16	1,500,575	2.54	0.01	6	
25 Town-centre refuge	113	0.09	503,681	0.85	0.02	11	
26 South Asian industry	10,827	8.89	725,936	1.23	1.49	723	
27 Settled minorities	4,286	3.52	991,695	1.68	0.43	210	
E Urban intelligence							
28 Counter-cultural mix	44	0.04	678,424	1.15	0.01	3	
29 City adventurers	629	0.52	561,848	0.95	0.11	54	
30 New urban colonists	221	0.18	726,135	1.23	0.03	15	
31 Caring professionals	735	0.60	606,229	1.03	0.12	59	
32 Dinky developments	9,962	8.18	488,323	0.83	2.04	989	
33 Town/gown transition	0	0.00	456,842	0.77	0.00	0	
34 University Challenge	0	0.00	294,045	0.50	0.00	0	

(Continued)

Table 1: Continued

	Slough	%	UK	%	Pen. %	Index	
	Population of Slough in each MOSAIC type		Population of UK in each MOSAIC type			Mean average index for Slough versus UK (100 = UK average)	
F Welfare borderline							
35 Bedsit beneficiaries	0	0.00	274,729	0.47	0.00	0	
36 Metro multicultural	150	0.12	990,476	1.68	0.02	7	
37 Upper-floor families	1,960	1.61	855,135	1.45	0.23	111	
38 Tower-block living	538	0.44	184,953	0.31	0.29	141	
39 Dignified dependency	153	0.13	550,905	0.93	0.03	13	
40 Sharing a staircase	0	0.00	271,770	0.46	0.00	0	
G Municipal dependency							
41 Families on benefits	2,246	1.84	838,640	1.42	0.27	130	
42 Low horizons	0	0.00	1,698,498	2.88	0.00	0	
43 Ex-industrial legacy	320	0.26	1,534,025	2.60	0.02	10	
H Blue-collar enterprise							
44 Rustbelt resilience	0	0.00	1,950,354	3.30	0.00	0	
45 Older right to buy	681	0.56	1,501,061	2.54	0.05	22	
46 White-van culture	17,872	14.67	1,988,145	3.37	0.90	436	
47 New-town materialism	2,497	2.05	1,536,003	2.60	0.16	79	
I Twilight subsistence							
48 Old people in flats	150	0.12	292,729	0.50	0.05	25	
49 Low-income elderly	863	0.71	822,995	1.39	0.10	51	
50 Cared-for pensioners	1,026	0.84	569,032	0.96	0.18	87	
J Grey perspectives							
51 Sepia memories	66	0.05	283,090	0.48	0.02	11	
52 Childfree serenity	995	0.82	605,636	1.03	0.16	80	
53 High-spending elders	0	0.00	826,085	1.40	0.00	0	
54 Bungalow retirement	0	0.00	618,551	1.05	0.00	0	
55 Small-town seniors	408	0.33	1,486,739	2.52	0.03	13	
56 Tourist attendants	0	0.00	138,570	0.23	0.00	0	
K Rural isolation							
57 Summer playgrounds	0	0.00	138,216	0.23	0.00	0	
58 Greenbelt guardians	0	0.00	1,058,857	1.79	0.00	0	
59 Parochial villagers	0	0.00	995,000	1.68	0.00	0	
60 Pastoral symphony	0	0.00	794,801	1.35	0.00	0	
61 Upland hill farmers	0	0.00	241,036	0.41	0.00	0	
Total	121,825	100	59,059,067	100	0.21	100	

Table 2: MOSAIC types at risk (greater than the national average) of Type II diabetes

Ranked MOSAIC types	Target	%	Base	%	Pen. %	Index
	Incidence of Type II diabetes across each MOSAIC type in UK		Population of UK in each MOSAIC type		% penetration of Type II diabetes across each MOSAIC type	Mean average deviation score for diabetes in UK MOSAIC types (average = 100)
50 Cared-for pensioners	32,984	4.16	569,032	0.96	5.80	432
48 Old people in flats	15,013	1.89	292,729	0.50	5.13	382
51 Sepia memories	11,198	1.41	283,090	0.48	3.96	295
26 South Asian industry	21,322	2.69	725,936	1.23	2.94	219
54 Bungalow retirement	15,910	2.01	618,551	1.05	2.57	192
39 Dignified dependency	13,950	1.76	550,905	0.93	2.53	189
43 Ex-industrial legacy	35,468	4.48	1,534,025	2.60	2.31	172
49 Low-income elderly	15,480	1.95	822,995	1.39	1.88	140
20 Asian enterprise	14,570	1.84	776,569	1.31	1.88	140
37 Upper-floor families	15,584	1.97	855,135	1.45	1.82	136
25 Town-centre refuge	9,100	1.15	503,681	0.85	1.81	135
38 Tower-block living	3,309	0.42	184,953	0.31	1.79	133
42 Low horizons	30,127	3.80	1,698,498	2.88	1.77	132
55 Small-town seniors	26,171	3.30	1,486,739	2.52	1.76	131
45 Older right to buy	26,114	3.29	1,501,061	2.54	1.74	130
56 Tourist attendants	2,410	0.30	138,570	0.23	1.74	130
24 Coronation Street	25,955	3.27	1,500,575	2.54	1.73	129
52 Childfree serenity	10,088	1.27	605,636	1.03	1.67	124
53 High-spending elders	13,612	1.72	826,085	1.40	1.65	123
16 Conservative values	26,504	3.34	1,639,657	2.78	1.62	120
46 White-van culture	30,551	3.85	1,988,145	3.37	1.54	115
36 Metro multicultural	14,947	1.89	990,476	1.68	1.51	112
27 Settled minorities	13,621	1.72	991,695	1.68	1.37	102
47 New-town materialism	20,946	2.64	1,536,003	2.60	1.36	102
23 Industrial grit	31,854	4.02	2,359,262	3.99	1.35	101

has an index of 140, suggesting these two population types have 2.2 times and 1.4 times the risk for Type II diabetes than the national average. Critically, these two population types are 'overrepresented' in Slough. Table 1 illustrates that 'Asian enterprise' has an index of 1,580 within Slough and 'South Asian industry' an index of 723, ie there are 16 and seven times higher numbers respectively of these types of people living within Slough. Together, these two population types make up 30 per cent of the population covered by Slough PCT.

Other population types overrepresented in Slough are 'Dinky developments', who have an index of 989. This population type is characterised by young, childless, predominantly white, suburban couples who have an index of 53 for generating hospital admissions for Type II diabetes, ie they are at half the national average risk. Targeting a social marketing intervention at this population would not be suitable.

Table 3 illustrates how by using these identified population types it is possible to drill down through the data to small local-area level to highlight 'hotspots' for communities at risk of Type II diabetes; in this case actually down to postal sector areas within Slough.

In Slough, 4.3 per cent of the population (4,845 from a total of 120,000) are known to suffer from diabetes. The local NHS true number including those at risk but who have not presented yet is estimated to be around 7 per cent.

Table 3: Postal sector ranked by geodemographic index for MOSAIC types ‘South Asian industry’ and ‘Asian enterprise’ within Slough PCT

Postal sector in Slough	Population size for ‘South Asian industry’ and ‘Asian enterprise’	% of ‘South Asian industry’ and ‘Asian enterprise’ by Slough postal sector	Total population in Slough	% distribution of total population in Slough	Mean average deviation score for ‘South Asian industry’ and ‘Asian enterprise’ population types (average = 100)
SL13	10,509	29	13,438	11	263
SL25	9,454	26	15,906	13	200
SL11	1,874	5	4,279	4	147
SL12	4,578	13	11,101	9	138
SL21	5,511	15	13,841	11	134
SL14	193	1	602	1	108
SL37	2,579	7	12,403	10	70
SL16	358	1	6,832	6	18
SL38	598	2	16,066	13	13
SL19	91	0	2,796	2	11
SL22	188	1	8,654	7	7
SL15	162	0	11,670	10	5
SL30	35	0	3,749	3	3
Overall total	36,130	100	121,337	100	

Understanding the behaviours of at-risk communities in Slough

Having located those most at risk of Type II diabetes, marketing analysis was conducted to understand the best techniques with which to communicate with these at-risk communities. Analysis revealed many of the Asian community were often economically disadvantaged. Analysis of shopping habits suggested they are more likely to shop at discount supermarkets like Netto and Kwiksave than at other retail food outlets such as Sainsbury’s or Tesco (Table 4). The Asian community was also discovered to be among the highest consumers of cable television —

Table 4: Food retail outlets most frequented by those most at risk of Type II diabetes

Shops visited	Average of neighbourhoods high in diabetes Type II
Netto	279
Kwiksave	206
Farmfoods	205
Aldi	184
Morrisons	178
Asda	135
Costcutters	130
Iceland	129
VG and Londis	112
Other shops	103
Cooperative	99
Alldays and Circle K	79
Tesco	75
Safeway	69
Somerfield	67
Sainsbury’s	63
Marks & Spencer	52
Budgens	26
Waitrose	13

particularly those channels posing the least linguistic challenge, such as the shopping channels (Table 5).

Seminars with local people in affected postcodes were conducted to fine-tune the strategies suggested by the segmentation analysis. In Slough, for example, the team learnt that a higher proportion than initially thought of mothers in Asian homes were not able to speak English, even in the second generation. Having uncovered the fact that the lifestyle characteristics of these groups meant they were likely to spend a lot of time in the home, a direct marketing campaign was designed which included the use of QVC-style (quality, value, convenience) videos and distinctive posters at community centres, libraries and in the workplace.

Once the community most at risk and their behaviours had been identified, close links with those working in the field were established. A senior diabetes nurse in Slough PCT organised a group of voluntary health counsellors from the Asian community. The health counsellors were critical to achieving a sense of 'community ownership' which would guarantee the longevity of the project once the initial pilot had been completed, and critically ensure the appropriate counselling support was available for those diagnosed.

Forty volunteer health counsellors were recruited — of whom 40 per cent were women and most were of working age. Recruitment of these volunteers proved popular with the local at-risk communities, and more than expected offered their services. Many knew diabetics or were themselves diabetic. They all spoke at least of one the community languages of Punjabi, Hindi and Urdu. The remit of the team of health counsellors was not to diagnose people with Type II diabetes, but help raise awareness and offer people support and encouragement to get tested for Type II diabetes and utilise local health services.

The team of health counsellors decided that direct individual interventions in certain postcode areas were likely to be the most effective means of raising awareness and changing health behaviours.

Based on the evidence from focus groups a multi-layered programme

Table 5. Marketing media most used by those most at risk of Type II diabetes

Learn about products	Average of neighbourhoods high on diabetes Type II
TV shopping channels	130
Telemarketing calls	125
Posters	108
Direct mail	101
TV adverts	101
Radio adverts	95
Leaflets	94
Free samples	88
Newspapers and magazines	84
Visiting shops	81
Catalogues	80
Family and friends	80
Internet	68
Telephone advice lines	66

of information marketing was then implemented with the help of the health counsellors in Slough. An 'Action Diabetes bus' was commissioned which took testing and health promotion services out to schools, temples, mosques, businesses and community centres in postal sectors highlighted as having a high density of people at risk of Type II diabetes. The voluntary health counsellors informed the local communities when the bus would be in their local area, through posters, word of mouth and leaflets delivered door to door.

The programme included a 'high-level' targeting (ie a celebrity magazine focused on diabetes distributed through local discount retailers and corner shops) and a personalised direct marketing approach by local health counsellors in their 'client' neighbourhoods, involving leaflet distribution door to door in at-risk postcodes from the Action Diabetes buses.

A promotional film was produced, featuring actor Saeed Jaffrey, diabetes patients and health professionals. It presented real-life stories in a format popular with the target audience — those most at risk. The film was distributed on the Action Diabetes bus and shown at schools, businesses and places of worship.

The results of the campaign were noticeable almost immediately, with increases in referrals occurring rapidly among those most at risk: 486 people reported for screening in the first week, none of whom had had any previous contact with the local diabetes services.

Interim results (March 2005) show that since the campaign was launched, there has been a 164 per cent increase in diabetes referrals within the Slough area. Results also show that of those being referred, nearly all are being diagnosed in the condition's earlier stages, enabling sufferers to manage their diabetes before it reaches a critical level.

Discussion

The overlay of geodemographic data with routine hospital admission data evidently has further possibilities and could potentially be extremely useful in maximising limited NHS resources for the benefit of the patient.

Identifying and mapping the community at risk of medical conditions using geodemographic segmentation analysis brings obvious strategic advantage to health planners, but the knowledge of how best to engage with those at risk is critical.

Social marketers emphasise that 'listening to the consumer' or 'consumer involvement' are all important in terms of initiating sustained behaviour changes in consumers.²¹ This stance is in keeping with the current view of public health professionals; that they are engaged in partnership with users of services and that they should enable 'user involvement' in the delivery of public healthcare.

The importance of consultation cannot be understated, particularly as the data used in geodemographic segmentation capture attitudes and beliefs concerning health status implicitly rather than explicitly.

The project in Slough would not have been successful without community consultation and ultimately delivering a project that 'felt' and was largely owned by the community. A positive result was that relations

between the Asian community in Slough and the local NHS were greatly strengthened.

Conclusion

This paper has reported on a study of Type II diabetes run against a commercially available geodemographic dataset. The theoretical and practical benefits of the combination of NHS data and geodemographic profiling seem to be considerable. Health professionals could use the approach outlined in this paper to devise social marketing campaigns tailored to clinical priorities to target various at-risk segments of the population at country, city, town, ward, neighbourhood and street levels.

Although the final evaluation of this project will not be completed until the end of 2005, interim results suggest such a methodology can provide a crucial tool to aid public health professionals in deploying resources in the most precise manner possible, maximising the cost benefit for the patient and health provider.

Encouraging communities at risk of Type II diabetes and other medical conditions to report for screening is not an easy task — the cultural and linguistic issues of black, minority and ethnic groups, for example, bring added challenges. But if these barriers can be overcome by proper consultation and empowerment of the community concerned, then such an initiative as the one piloted in Slough has the ability to be an essential tool in addressing the government's priority of reducing health inequalities, particularly among marginalised and deprived communities.

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