AN EVIDENCE-BASED APPROACH TO DIGITAL INCLUSION FOR HEALTH

CRESI RESEARCH REPORT

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Summary

This report is the first deliverable of the "Digital Inclusion and Social Knowledge Media for Health: Frameworks and Roadmaps" project. It discusses the concept of social and digital exclusion and suggests that a focus on the digital mediation of social processes may provide more purchase for public service providers. This focus leads to the consideration of the way in which digital services might support a range of health-related factors which are both directly and indirectly linked to specific health outcomes. The report discusses some examples in the light of a consideration of the specific (and spatial) health needs and priorities of Solihull Care Trust. The report concludes with suggestions for directions for future research and development.

Citation

Anderson, B and Speed, E, (2009) *An Evidence-Based Approach To Digital Inclusion for Health.* Report to Solihull Care Trust. Colchester, University of Essex.

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1 BACKGROUND

The 'digitisation' of health and care services continues apace with significant investment being made in technological infrastructure, applications and services as well as the requisite workplace change management required to ensure that these tools are able to effectively support both existing and innovative interventions and practices. Whilst much of the effort to date has focused on 'internal digitisation' in the form of new health infrastructures through, for example, Connecting for Health, considerable attention has also been given to 'external digitisation' in the form of new approaches to patient and citizen service provision.

This report addresses the threats and opportunities associated with digital exclusion from an 'inclusive health' perspective and develops a roadmap for potential future research and development activity with a particular focus on the needs of Solihull Care Trust.

2 SOCIAL AND DIGITAL INCLUSION EXPLAINED

Digital inclusion for health is of course just one part of an ongoing concern with social and digital inclusion that has preoccupied academics, commentators and policy makers since the emergence of widespread digital services in the late 1990s and even before that with respect to telephony and other telecommunications services. Before concentrating on health it is therefore worth summarising this background.

2.1 Social inclusion

Social inclusion is a notoriously slippery concept that has seen a wide range of attempts at definition and operationalisation at both the individual/household (micro) and area (neighbourhood) levels inspired in great part by the early work of Townsend (Townsend 1979; Townsend P 1987; Gordon and Townsend 2000). Here

> "people can be said to be deprived if they lack the types of diet, clothing, housing, household facilities and fuel and environmental, educational, working and social conditions, activities and facilities which are customary." (Townsend P 1987)

By extension, poverty is seen as the lack of the economic wherewithal to escape deprivation although economic resources are not all that may be required. As an example sociologists such as Bourdieu (1986) have developed the concept of a range of 'capitals' which are seen as enablers for securing the kinds of resources that prevent social exclusion. Whilst Bourdieu focuses on economic (an accumulation of economic wealth), social (an accumulation of social obligations or 'debts') and cultural (an accumulation of cultural 'knowledge') capital others have added political (civic or social order) and personal (emotional, health or well-being) capitals (Ling, Anderson et al. 2004).

In this conceptualisation deprivation is therefore a lack of different kinds of resources and social exclusion is seen as the result of the lack of these resources. Conversely social inclusion is therefore seen as having necessary resources to participate fully in social, political, cultural or economic life. Both deprivation and social exclusion are therefore multi-dimensional in nature.

This resonates with Sen's capabilities approach which emphasises that it is not the access to resources that counts but the 'capabilities' that those resources enable (Sen 1993). This approach suggests that we should focus on whether or not individuals have a set of basic and non-basic capabilities (nourishment, shelter, health, freedom) however these are defined in their social context. This approach is naturally relative since it relates an individual to what is needed in his/her social context to enable them to do valuable acts or reach valuable states of being – what a person can do/be.

Social inclusion (and in Sen's view 'quality of life' or 'wellbeing') is therefore the capability to achieve valuable 'functionings' e.g. – adequately nourished, being in good health (escaping avoidable morbidity, premature mortality etc), achieving self-respect, being socially integrated and being happy. Thus the means of living or means of freedom are not of direct importance

and it is this which mark's Sen's approach apart from the 'welfarist' approaches which see these means as valuable in terms of what benefit (utility) they provide (Sen 1993).

2.2 Social inclusion and the quality of life

More recent attention to 'well-being' or 'quality of life' has developed this thinking further across the social and medical sciences in order to develop indices of 'quality of life'. These indices frequently combine not only *objective* (i.e. welfarist) measures such as levels of income deprivation but also *subjective* measures such as satisfaction with income levels (Cummins, McCabe et al. 1994; The WHOQOL Group 1999; Hagerty, Vogel et al. 2002; Skevington and O'Connell 2004; Skevington, Sartorius et al. 2004).

This approach enables an individual in one cultural context to be as 'happy' as one in another but be less wealthy, have fewer consumer items, less leisure time and so forth because their perception of their life context relative to others around them (their social conditions) sets the backdrop for measurement.

Of course one of the problems with the subjective approach is that what is being measured may well be determined by the individual's adaptation to their life experiences so that whilst their life conditions are objectively poor, they experience no dis-satisfaction. Conversely some individuals may experience objectively good life conditions but express dis-satisfaction, a situation termed 'dissonance' (Festinger 1957). Welfarists, as attacked by Sen, (1993) focus on objective conditions in order to avoid the problem of adaptation and so are interested in driving up 'welfare' without really worrying about whether this makes anyone feel better.

Table 1: Objective and Subjective quality of life (after (Zapf 1984))

|		Subjective conditions	
		Good	Bad
Objective Conditions	Good	Well-being	Dissonance
	Bad	Adaptation	Deprivation

This might appear to be an academic diversion but in fact the distinction between objective and subjective measures turns out to be a crucial point of tension for public policy makers and service providers. As an example, it may be that attaining an objective target in health care provision bears little relationship to the experience of (increased) service quality by the recipients of that provision or their expressed satisfaction with the service[1]. On the other hand, if measurement relies on subjective indicators then we face the adaptation issue[2].

As Fahey et al note (Fahey, Nolan et al. 2003) following Cummins (Cummins 1997) it must be best to combine the two when speaking of quality of life since, for example, it would be problematic to describe a population as having low QoL if they score highly on the objective measures alone but have consistently low self-reported satisfaction levels.

Drawing these strands of deprivation, social exclusion and quality of life together we can present a schematic representation of a range of concepts, their indicators and the social processes on which policy might seek to act and which digital technologies may mediate.

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[1] Such as through patient satisfaction surveys.

[2] Given recent interest in using 'satisfaction targets' as the basis for management targets linked to increased funding, it should be quite apparent that service providers who give an excellent service to 'dissonant' patients (such as those with unfeasibly high expectations) will be severely disadvantaged compared to those who provide a poorer service to 'adapted' patients (those with low expectations)
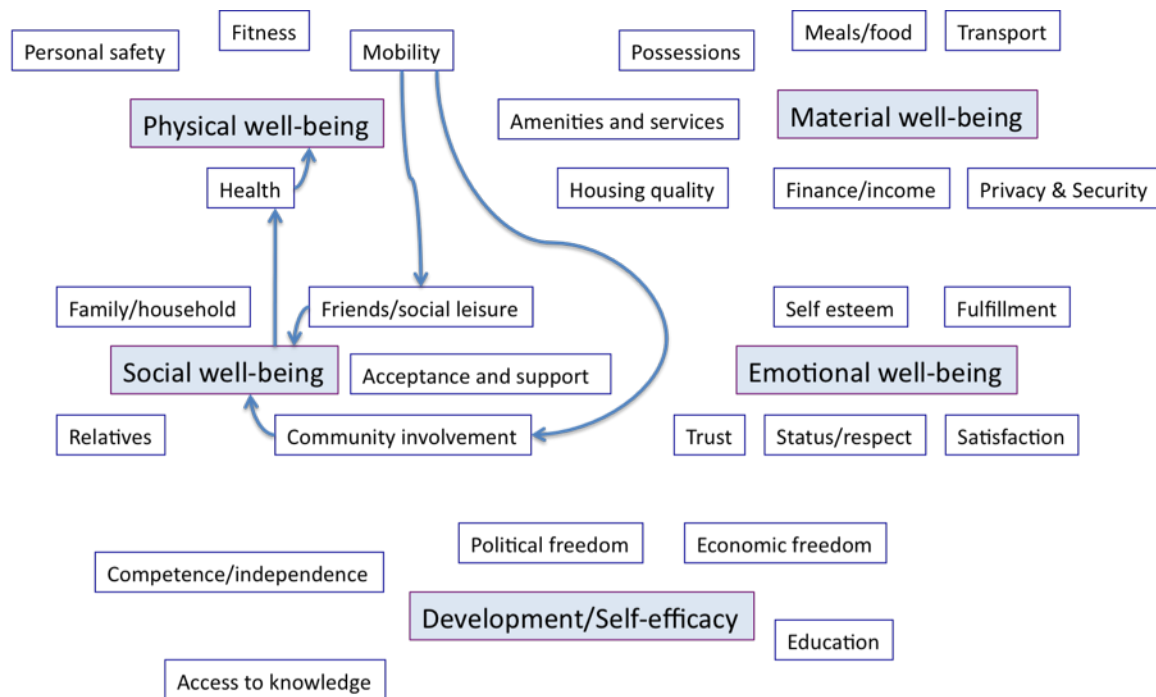
Figure 1: 'Well-being' concepts (blue boxes) and indicators (white). From (Ling, Anderson et al. 2004), after Felce and Perry (Felce and Perry 1995). Example relationships shown, all indicators should be considered to have objective and subjective dimensions.

Figure 1 represents these concepts as blue boxes and surrounds each with indicators that are accepted sub-dimensions of the concept. There are of course a myriad ways in which the indicators are related through social processes such as, for example the relationship between mobility, social leisure activities and both subjective and objective health (Ling, Anderson et al. 2004). The diagram excludes all but a few exemplars. It should also be noted that the social processes linking these indicators may be more or less significant for different social groups such as young working adults versus the elderly and immobile.

With this schematic in mind, social exclusion at the individual level is therefore seen to occur when a person (or household) lacks the resources to achieve these forms of well-being. Inevitably many will lack some of these resources and it may be that in particular contexts these specific 'poverties' are compensated by others. It is important to remember then that social exclusion requires the cumulative lack of multiple resources or the total lack of specific critical resources and it is also notable that much the same configuration of dimensions is well known to influence the development and outcome of chronic illness (Glass and McAtee 2006; Greenhalgh 2009).

2.3 Digital Inclusion

Given the foregoing discussion of the multidimensional nature of social exclusion, it is tempting to conceive digital exclusion as simply one further concept (blue box) or dimension. Indeed this has been the most common way of considering the relationship between social exclusion and consumer adoption of digital technologies. Characterised as the 'Digital Divide' early research focused on levels of uptake of technologies such as personal computers and home internet access and highlighted their differential adoption across social groups such as by age, income or ethnic background (Fong, Wellman et al. 2001; Norris 2001; Katz and Rice 2002; Robinson, DiMaggio et al. 2003). Such studies showed consistent support for a correlation between a range of dimensions of social exclusion and low rates of uptake of personal computers and home internet access.

In the UK this is easily confirmed by analysis of the Office for National Statistics' Expenditure and Food Survey (EFS) which collects data on technology use in the home (see Figure 2). As we can see ownership of fixed line telephones has shown a steady decline since the late 1990s whilst mobile telephones, Digital TV and household internet access have all shown upwards trends of varying rates. Household internet access, of which 95-99% is PC-based (not shown)

shows some signs of reaching a plateau at around 60% with slow growth now restricted to the retired and inactive (see Figure 2b) and the difference between the highest and lowest uptake groups (*Access Gap*) remaining high. In the case of mobile telephones the proportion of households having at least one has reached a plateau of roughly 80% with all social groups appearing to have reached saturation by this measure (see Figure 2c). However the *Access Gap* for mobiles is lower and continuing to decline suggesting that access to mobile telephony is far more equitable than is access to home-based internet access. Digital TV in the other hand shows a continuing upward trend with an even smaller *Access Gap*.
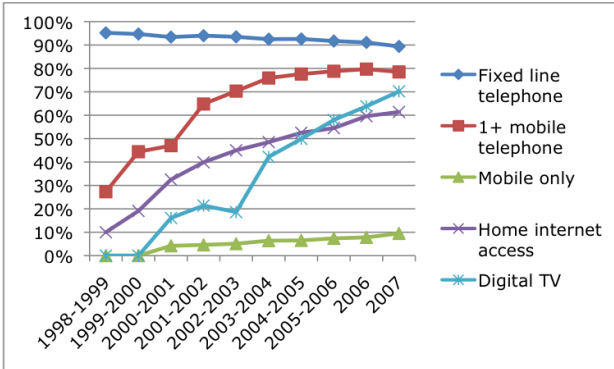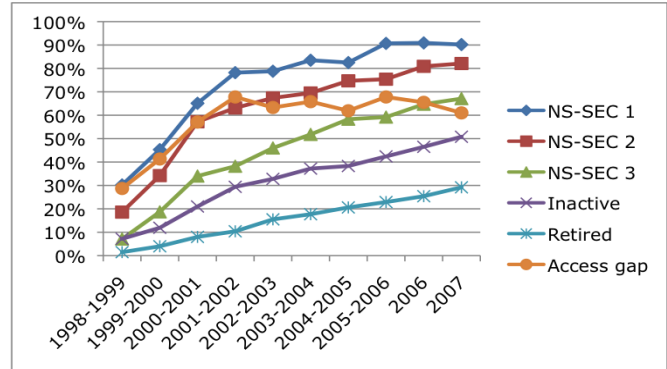

Figure 2*a: Home ICT Uptake (UK) 1998-2007*

Figure 2*b: Home internet uptake by employment status of the household response person*[3]
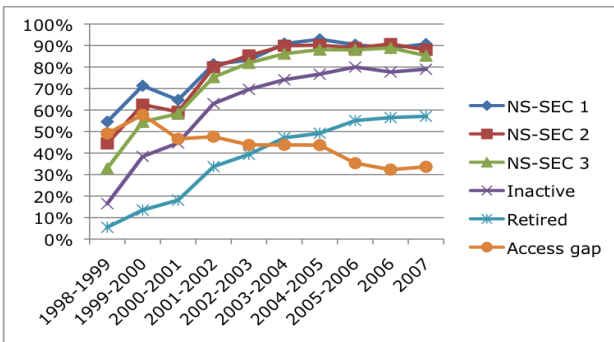

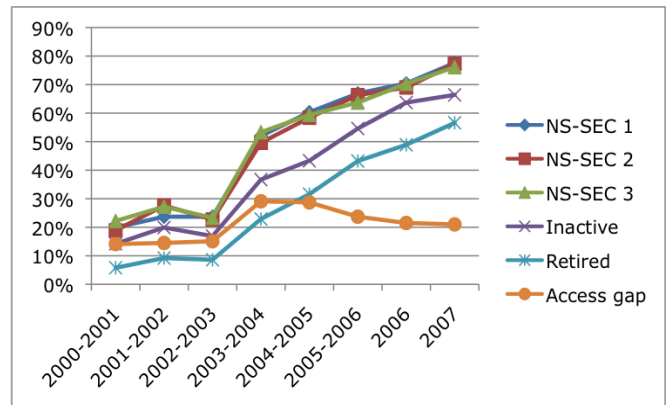Figure 2*c: Mobile telephone uptake employment status of the household response person*

Figure 2*d: Digital TV uptake by employment status of the household response person*

Figure 2: UK ICT Trends 1998-2007. Source: author's calculations from the ONS' Expenditure and Food Survey (EFS) data
Figure notes:
1. 'Access Gap' = difference between the highest and lowest uptake groups.
2. Discontinuous curves in 2001/2 – 2002/3 are due to changes in the definitions of some variables

This is confirmed by multivariate analysis that showed that there were lower correlations between dimensions of social exclusion and levels of mobile telephony and digital television uptake other than at the extreme margins of society (Rice and Katz 2003; Anderson 2005; Anderson 2008). Ongoing research such as the biennial Oxford Internet Survey have also highlighted the continuing dominance of home-based access in the UK with 95% of respondents reporting home-based use alongside 41% at work[4], 35% at another's home and 20% on the move (new in 2009). Only 8% report its use in an internet café and 14% in a public library and 16% in a school or university (Dutton, Helsper et al. 2009). Whilst empirical

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[3] The person responding to the survey 'on behalf of the household'. Employment status is defined as NS-SEC 1 (Managerial and professional occupations); NS-SEC 2(Intermediate occupations); NS-SEC 3 (Routine and manual occupations); Inactive (including students, unemployed and other non-working adults below pension age) and Retired (non-working above pension age).
[4] Respondents were allowed to select multiple locations.

data on health related usage is less easily obtained, European survey analysis has suggested that in the case of health-oriented usage, access in a public space may be generally less attractive (Anderson 2005) although access in the household space may also raise privacy and other difficulties for some.

However it has also been acknowledged that *access* to communication and information technologies is not all that is required to ensure productive or effective *use* (Thomas and Wyatt 2000). As a result 'Digital Inclusion' programmes which have sought simply to install technology through home-based or public-centre based initiatives have had little effect on rates of use in the longer term (Gaved and Anderson 2006) and have generally simply replicated existing social stratifications with the better equipped through, for example literacy and numeracy levels as well as self-confidence, securing the greatest benefits (Hargittai 2008; Robinson 2009). Research has shown that as a result the benefits of online services, including those oriented towards health may simply accrue to those who are least deprived or least socially excluded (Anderson 2005; Selwyn 2005) thus exacerbating rather than ameliorating the social stratification of health. However more recent work has provided some evidence that whilst higher income/education internet users are still more likely to search for health information, lower socio-economic status groups and those in poor health are more likely to use peer groups/online forums although this is a rare activity and so may be subject to sampling error (Atkinson, Saperstein et al. 2009).

In addition it has (rather belatedly in policy circles) been realised that some groups of the population actively don't wish to adopt and use new media technologies for a range of reasons that are not related to cost or lack of skills and competences in their use (Wyatt, Thomas et al. 2002; Selwyn 2006; Dutton, Helsper et al. 2009). These non-users range from the simply disinterested to the actively rejecting and according to Dutton et al the heterogeneity of responses suggest no overall strategy is likely to persuade them otherwise (Dutton, Helsper et al. 2009).

More recent analysis focussing on the overlaps between social exclusion (as defined above) and digital exclusion (defined in terms of attitudes, access, skills and use) confirms this idea by highlighting that 53% of those who are severely socially excluded (9% of the UK population) are also severely disengaged from specifically internet technologies (Helsper 2008). However the study also revealed a population segment (5% of people) who are 'unexpectedly' digitally excluded largely through choice and a further segment (4%) who are unexpectedly digitally included given their socio-economic circumstances.

Missing from this analysis however is the consideration of other technologies that may in fact have 'social inclusion' dimensions that outweigh those of internet based services as currently understood. An obvious example is the mobile telephone with its well-known support for the maintenance of social and kinship networks and to feelings of security in public places (Goodman 2003; Ling, Yttri et al. 2003; Ling 2004). This point leads us towards a careful re-consideration of the effectiveness of the term 'Digital Inclusion' because it should now be apparent that as the bundle of access technologies (mobile phone/PDA/PC/laptop etc), network infrastructures (telephony/SMS/internet-based) and uses/services (e.g. information seeking, social communication, media consumption and production) evolve over time. It is therefore conceptually impossible to define a consistent basis for measuring 'digital exclusion' and even if it was, it would be all too easy to assume that 'fixing' inequalities in these dimensions will automatically fix deeper social inequalities. This is simply not the case.

As a result although conceiving of digital exclusion as a set of dimensions of deprivation that intersect with dimensions of social exclusion is clearly of use in terms of measuring levels of indicators at a given time, it is not particularly useful for suggesting ways to use new information and communication technologies to support social inclusion itself and especially in a health context. To do this we turn to a different way of thinking about digital technologies in the context of inclusion/exclusion and instead ask in what ways different bundles of technologies can help to deliver different kinds of interventions and services to whom and to what effect given current and future patterns of access to and skills in using those bundles.

2.4 Summary: digitally mediated inclusion

In order to flesh out this approach we return to the discussion of wellbeing presented in

Section 2.2 and specifically in Figure 1. Rather than considering digital inclusion as another part of this wellbeing structure, we instead consider digital mediation of the social processes inherent in the structure. As a result, we must therefore consider:

- Which of the immense range of social processes inherent in the structure are amenable to digital mediation
- In what ways different technologies and services may affect these social processes
- In what ways different access devices, modes of interaction and locations of use affect these processes

Clearly a systematic dissection of Figure 1 is a major undertaking and beyond the scope of this report, but in order to make these ideas more concrete we consider as an example the highlighted pathways. Here we see a key relationship between mobility and social well being which in turn is known to have an effect on health (Myers 1999; Pevalin and Rose 2003) especially for older persons (Marmot, Banks et al. 2003). With these processes in mind we can then ask to what extent new social technologies might mediate and support community involvement or an active social life and what kinds of actions might need to be taken if the specific group to be targeted (e.g. older persons) tends to be less likely to engage with these technologies. As an example previous research has suggested that providing a mobile telephone for all persons would make little difference to a range of social capital indicators in the population as a whole but would make a substantial difference to older people (Anderson 2006).

A second example might consider the use of health related information by 'empowered' citizens. Interestingly the ways in which different kinds of people with different degrees of 'internet engagement' fold internet-sourced health information into their daily lives are not always defined by wealth, educational attainment, internet experience or skills (Nettleton and Burrows 2003; Nettleton, Burrows et al. 2004; Anderson 2005) as some have suggested (Dutta-Bergman 2004; Houston and Allison 2004). It therefore becomes necessary to understand the literacies (digital or otherwise) that are required to enable citizens to find, appraise and make use of health information sourced through digital and other media.

Critical to this way of thinking is therefore the consideration of which combination of media technologies are necessary and appropriate for a given health/care outcome or intervention and for the targeted groups. Such a nuanced approach must also take into consideration, for example, the 'capabilities' (both digital and otherwise) of the target groups to access, interact with and act through digitally mediated health and care services. Thus, even if unproblematic access is assured, a range of social resources may be required to effectively make use of digitally mediated services and thus to produce the intended health/care outcome (Helsper 2008). It is this that must form the basis for any Digital Inclusion Strategy.

3 SOCIAL AND DIGITAL INCLUSION FOR A HEALTHY SOLIHULL

Given the implication that digital inclusion strategies have to be embedded within mainstream, service delivery rather than being considered in any way independent, digital inclusion becomes part of a wider social inclusion agenda. We therefore need first to outline the major health priorities for Solihull based on the 2008 Joint Strategic Needs Assessment (JSNA), and align these with known or estimated patterns of social exclusion and uptake of digital technologies in order to outline potential interventions that could use digital technologies to alleviate social exclusion in the health context.

3.1 An overview of area level 'social exclusion' in Solihull

Whilst intuitively appealing the approach outlined in Section 2.2 has proved difficult to operationalise in such a way as to be of practical use in the development of social inclusion/exclusion indicators intended to inform policy interventions (Noble, Wright et al. 2006). In particular whilst objective data exist at the neighbourhood level, subjective indicators would require at least a very large sample survey and most probably an impossibly expensive regular 'attitude' census. As a result the development of the indicators of social deprivation which are probably most familiar, the English Indices of Multiple Deprivation, build

more closely on Townsend's approach making normative assumptions, based on consultation and evidence, about what aspects of area level measures should constitute deprivation and thus reveal *places* where inhabitants are more likely to be at risk of social exclusion (Noble, Wright et al. 2006). The overall 2007 index combines measures of:

- Income deprivation – measured through counts of income related means-tested benefits claimants.
- Employment deprivation – measured through counts of unemployed persons and those receiving certain kinds of incapacity (i.e. inability to work) benefits.
- Health Deprivation and Disability – measured through the prevalence of prescribing for mood/anxiety disorders, calculated 'years of life lost', measures of premature death and measures of the prevalence of disability.
- Education, Skills and Training – measured through school test scores, secondary school attendance rates, the proportion of working age adults with low qualifications and the rates of 16+/18+ education participation.
- Barriers to Housing and Services – measured through indicators of overcrowding, homelessness, difficulty of accessing owner-occupation and distances to a post office/school/GP survey and general store or supermarket.
- Crime – measured as the incidence of burglary, theft, criminal damage and violence.
- Living Environment – measured through the prevalence of poor housing, lack of central heating, air quality and road traffic accidents.

Taken together these indicators provide measures of what could be termed 'objective wellbeing' at the Lower Layer Super Output Area (LSOA) level and give an idea of the social and health deprivation landscape of Solihull. However it should always be remembered that area level measures can mask considerable within-area variation so that LSOAs classified as 'deprived' will always contain some people or households who are not and, conversely, areas classified as not deprived may still contain people and households who are deprived on one or several of the dimensions. This has implications for the mode and manner of delivery of a SCT digital inclusion strategy across areas of high deprivation (but with pockets of prosperity) and across areas of low deprivation (but with pockets of poverty). The DI strategy will need to be implemented in such a way that it is not more amenable to one or other types of group.
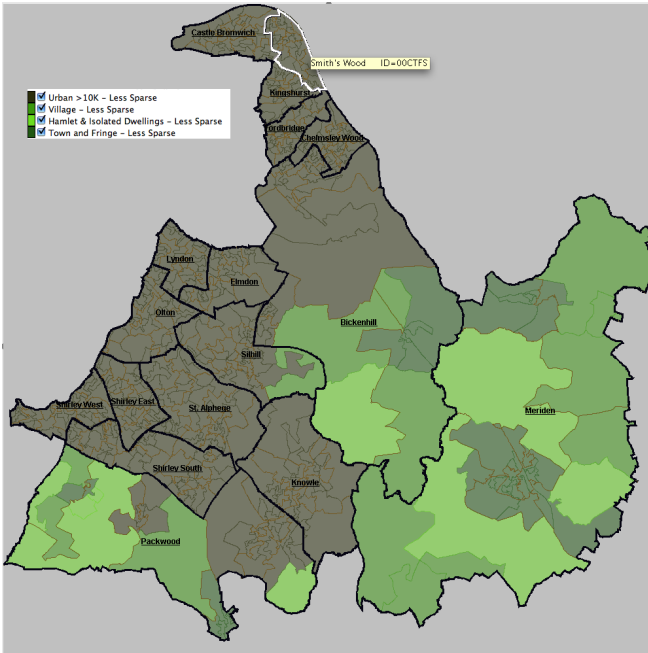
Figure 3: OA level rural/urban classification by OA (ONS 2001) showing ward boundaries and labels.
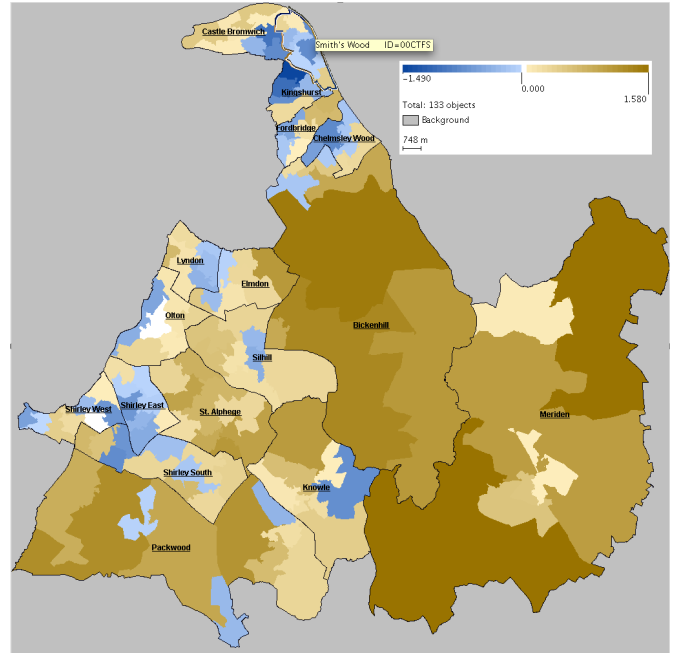
Figure 4: LSOA level IMD Geographical barriers subdomain score (CLG, 2007) showing ward boundaries and labels.

Figure 3 shows the 2001 urban/rural classification of output areas (OAs) within the Solihull PCT area whilst Figure 4 shows the related IMD 2007 'geographical barriers to services'[5] subdomain score at the LSOA level. Clearly it is generally the case that the central, south western and eastern areas are less urban and have a higher risk of poor geographical access to services. There are however urban areas in the northern central region which are also relatively lacking in geographical access to services and given the ability of digital technologies to overcome some aspects of geographical exclusion these may be areas of future interest although rural/urban differentials in access to advanced network infrastructure must be borne in mind (Stern, Adams et al. 2009).

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[5] Road distance to: a GP surgery, general store or supermarket, primary school, Post Office or sub post office
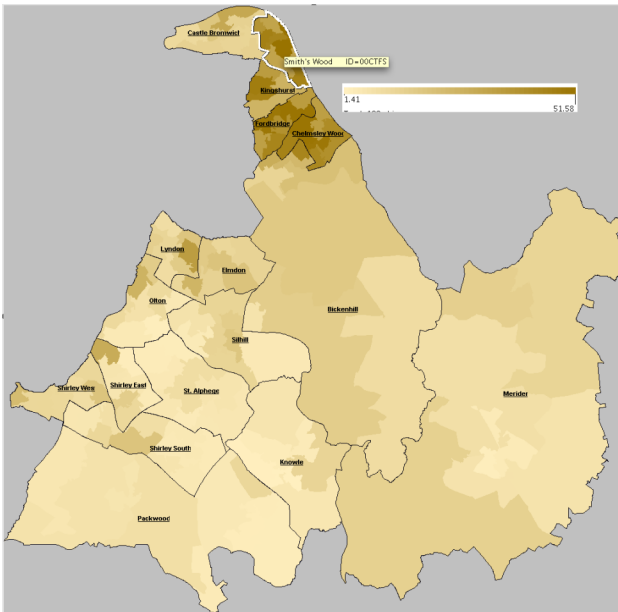
Figure 5: LSOA level overall IMD 2007 score (CLG, 2007) showing ward boundaries and labels.
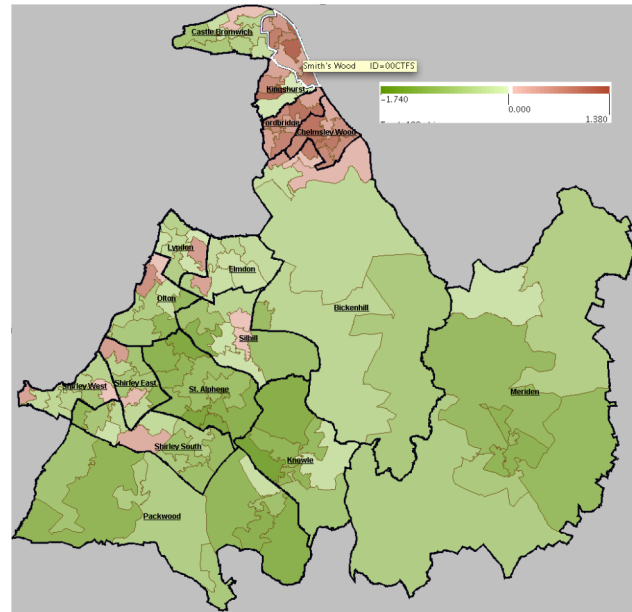
Figure 6: LSOA level IMD 2007 Health & Disability subdomain score (CLG, 2007) showing ward boundaries and labels.

Figure 5 shows the overall IMD 2007 scores at LSOA level for Solihull whilst Figure 6 shows the IMD 2007 Health and Disability domain scores at LSOA level. As the Strategic Needs Assessment makes clear, the most deprived (potentially socially excluded) areas of Solihull as measured by the overall IMD are in the urban north with a few pockets in the west. These are also generally the areas with highest (i.e. worst) Health & Disability scores (see also Figure 7).

When considered solely by national ranking in terms of IMD scores, the three areas reporting the highest levels of deprivation were LSOA 004B, (in Smith's Wood) with a national ranking of 2018. This was followed by LSOA 006D (in Fordbridge) with a national rank score of 2118 and then LSOA 006A (in Chelmsley Wood) with a nationally ranked score of 2163.
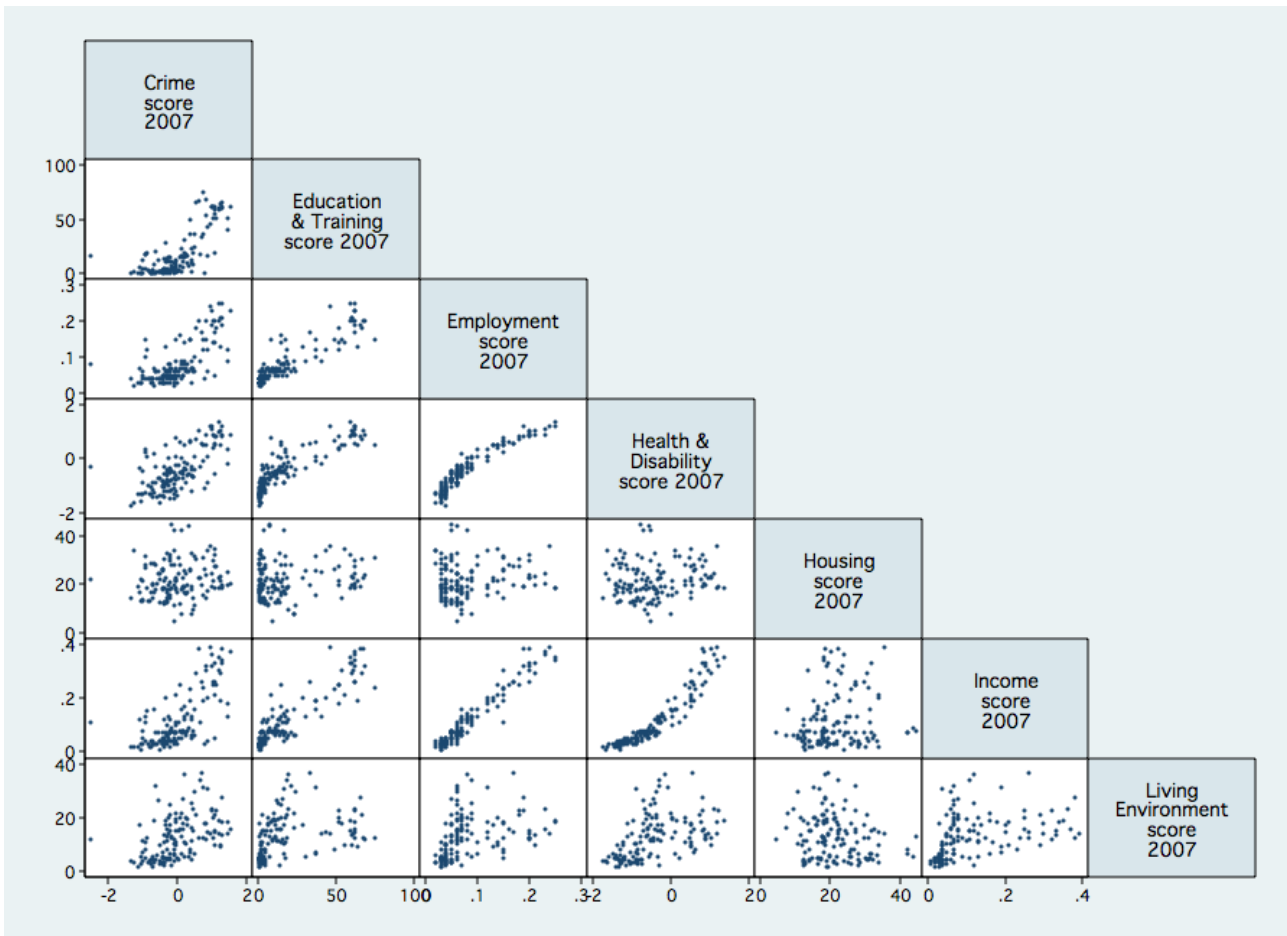
Figure 7: Cross-correlation of LSOA level IMD 2007 domain scores (CLG 2007)

In general the individual domain indicators correlate with each other in Solihull (Figure 7) and this is especially true of the employment, income and health deprivation scores. On the other hand it is noticeable that health deprivation is less strongly correlated with housing related deprivation than it is with the other dimensions. The two strongest correlations with Health and Disability deprivation scores are employment deprivation and income deprivation. This is indicative of the strong relationship between employment income and health status (see Section 3.2.1, p13).

3.2 The social geography of health needs in Solihull

Having identified the distributions of social exclusion as measured by the 2007 IMD we turn now to an analysis of the social geography of health needs as revealed by the trust's Joint Strategic Needs Assessment[6] and by our own analysis of data available through the Office for National Statistics' Neighbourhood Statistics and other sources. It is not our intent to replicate the Needs Assessment analysis but to use it and other sources to provide a context for the subsequent discussion of potentially digitally mediated interventions that would make sense given SCT's priorities.

The population of Solihull Metropolitan Borough is around 203,600[7] and is expected to expand by 8% by 2018 In particular the 65+ population is expected to increase by 24% and the 85+ population by 55% over the next ten years. This has two major implications in terms of health and social care. Firstly, the expansion of the elderly population will see a similar expansion in the levels of long-term limiting conditions within the LSOA. Secondly, the expansion of these

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[6] There is a degree of disjuncture between the JSNA and the data presented here, because the JSNA uses both LSOA and ward level data, whereas much of the analysis presented here is compiled on LSOA basis.

[7] All populations estimates included in this paper are based on Resident Population Estimates by Broad Age Band, taken from the Indices of Deprivation 2007 data.

population groups will require a fundamental re-shaping of both the health and social care services available, and their mode of delivery.

In this section we consider first care-giving and mental health needs before focusing on the three priority areas of children, adults of working age and older people.

3.2.1 Care giving across SCT

Involvement in the provision of high levels of unpaid care has numerous implications. Most immediately it can impact upon the carers' ability to participate in paid employment. In areas with high IMD scores, this additional activity may be acting as a further barrier to participation in paid employment. Carmichael and Charles (1998; 2003) identify how by working fewer hours the gross earnings of carers is reduced, whilst simultaneously, care giving and the care needs of other family members or friends can impose further financial and opportunity costs on individuals. The range of time demands placed on carers may also mean that people in this category tend to be concentrated in lower pay jobs, due to lower levels of reliability (from the perspective of their employers) and a greater need for flexible work arrangements. In turn this may also mean that they are less likely to be promoted or employed in key positions. They find that women are more likely to be carers than men and that female carers spend much more time caring. Carmichael and Charles (1998; 2003) have shown that informal carers exhibit substantial opportunity costs in the form of forgone earnings as a result of their caring responsibilities. Heitmuller and Inglis (2007) assert that many individuals combine work and care provision, often at the expense of career prospects, leisure time, income, and pension entitlements.

The links between unemployment or insecure employment, (i.e. the two employment positions carers are more likely to find themselves in), and general levels of health and wellbeing are already well established (Clark and Oswald 1994; Frijters, Haisken-DeNew et al. 2002; Blanchflower and Oswald 2004). Add to this the physical and emotional impact of providing long term care and it becomes clear that the provision of informal caring can have significant and multiple effects upon levels of health and wellbeing. A recent study by Simon et al. (2009) highlights some of the impacts on physical and emotional wellbeing for informal carers for new stroke patients. In a 15 month study a carer cohort was compared to a cohort of 50 matched non-carers. This research highlighted that carer distress was common (37–54%), started early on in the care-giving experience and continued until 15 months after stroke. In addition, carers were found to be 2.5 times as likely as non-carers to have significant psychological distress.
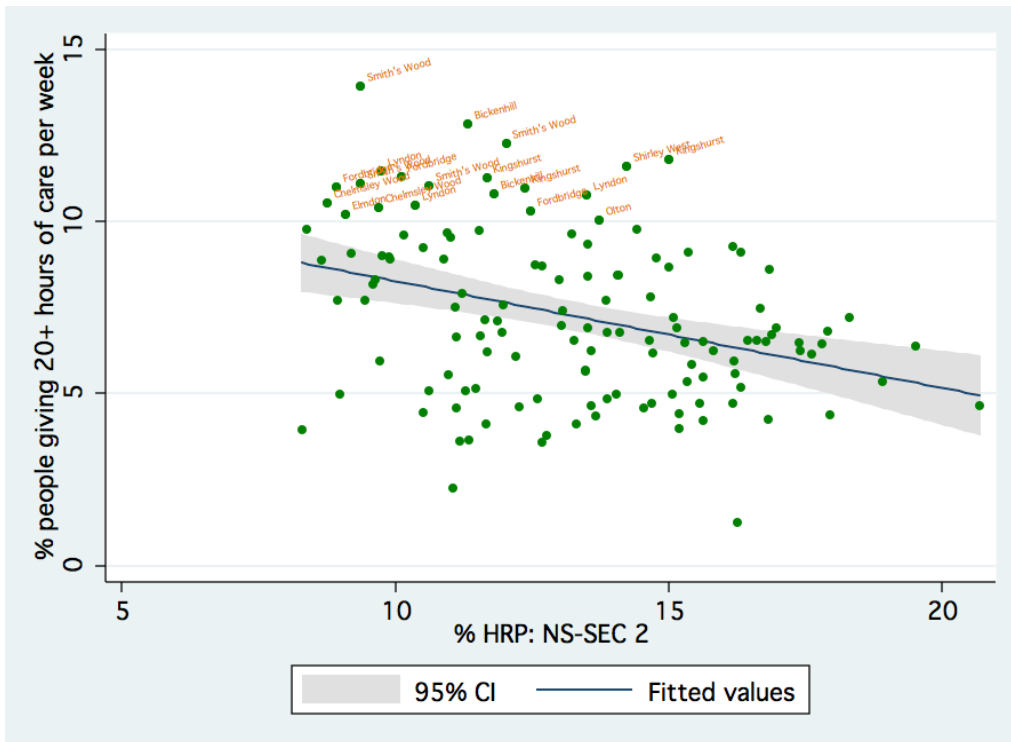
Figure 8 shows that there is some degree of correlation between the distribution of care giving[8] and poor health at the area level but that the effect is different for different levels of care. Thus areas with a high proportion of people giving lower levels of care (1-19 hours per week) appear to be negatively correlated with the overall Health and Disability score. However areas with a high proportion of people giving higher levels of care (50+ hours) are positively correlated with high health/disability score areas[9] although our own analysis (not shown) suggests little correlation between areas with a high proportion of older household response persons and high levels of care. This is confirmed by Figure 9 which suggests that those giving higher levels of care tend not to be in areas of high employment status persons but that areas with a high proportion of retirees are not necessarily also those with a high proportion of high carers (Figure 13). Instead, and partially confirming the discussion above, it seems that high proportions of household response persons with lower status jobs or who are inactive are associated with higher rates of care-giving (Figure 11 and Figure 12).

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[8] In the UK 2001 census 'care' was defined as: "Provision of unpaid care: looking after, giving help or support to family members, friends, neighbours or others because of long-term physical or mental ill-health or disability or problems relating to old age."

[9] The Health & Disability score uses counts of various benefits including Disability Living & Attendance Allowances and Incapacity benefit so some correlation is to be expected.

Figure 8: IMD 2007 Health & Disability score compared to levels of caring (Census 2001)

Figure 9: Proportion of persons giving more than 20 hours care per week compared to proportion of household response persons with in employment group NS-SEC 1[10] (Census 2001, LSOAs with higher than 10% heavy carers labelled by ward)

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[10] Managerial and professional occupations (See http://www.ons.gov.uk/about-statistics/classifications/current/ns-sec/cats-and-classes/ns-sec-classes-and-collapses/index.html)

Figure 10: Proportion of persons giving more than 20 hours care per week compared to proportion of household response persons with in employment group NS-SEC 2[11] (Census 2001, LSOAs with higher than 10% heavy carers labelled by ward)
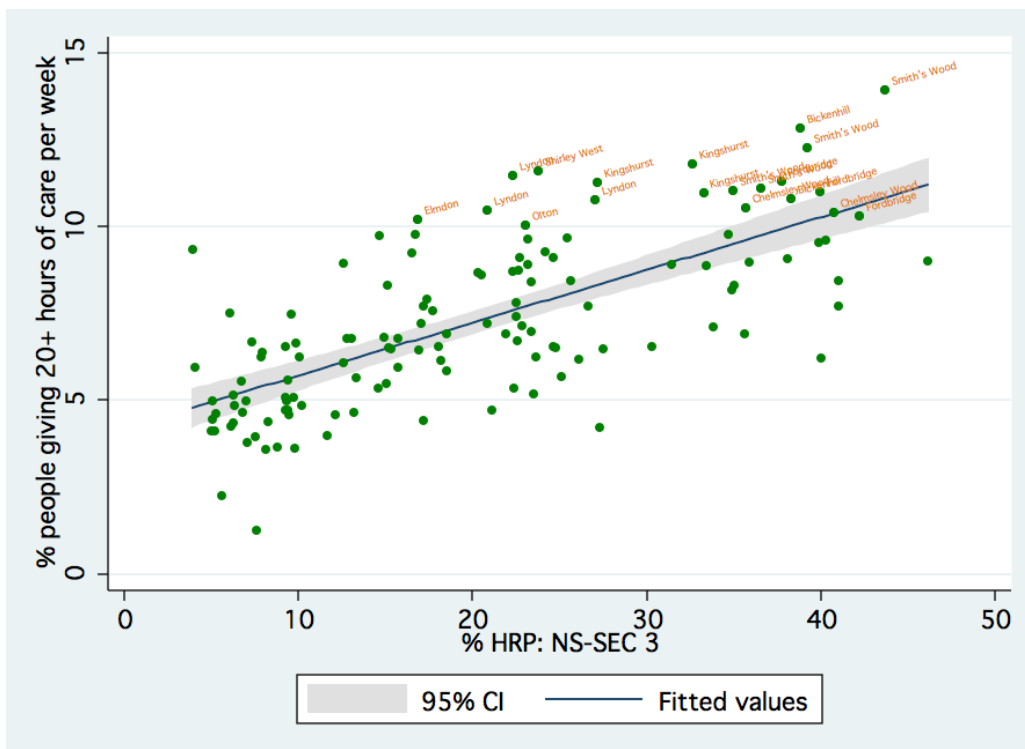
Figure 11: Proportion of persons giving more than 20 hours care per week compared to proportion of household response persons with in employment group NS-SEC 3[12] (Census 2001, LSOAs with higher than 10% heavy carers labelled by ward)

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[11] Intermediate occupations
[12] Routine and manual occupations
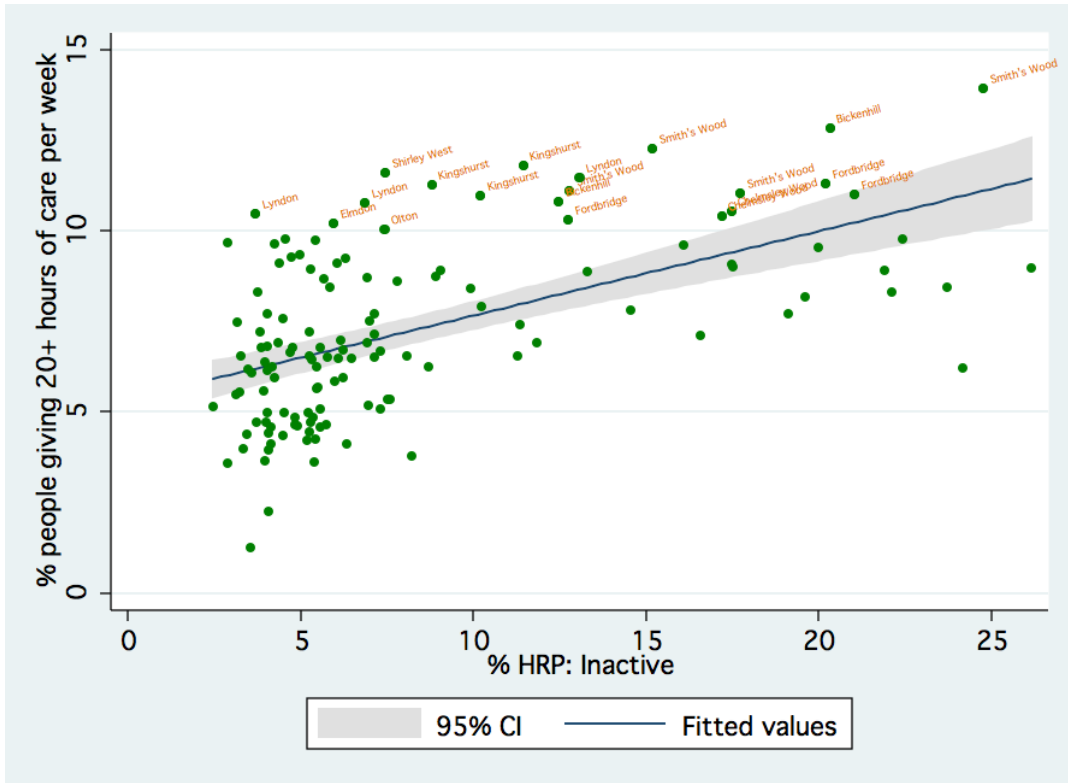
Figure 12: Proportion of persons giving more than 20 hours care per week compared to proportion of household response persons who are inactive (Census 2001, LSOAs with higher than 10% heavy carers labelled by ward)
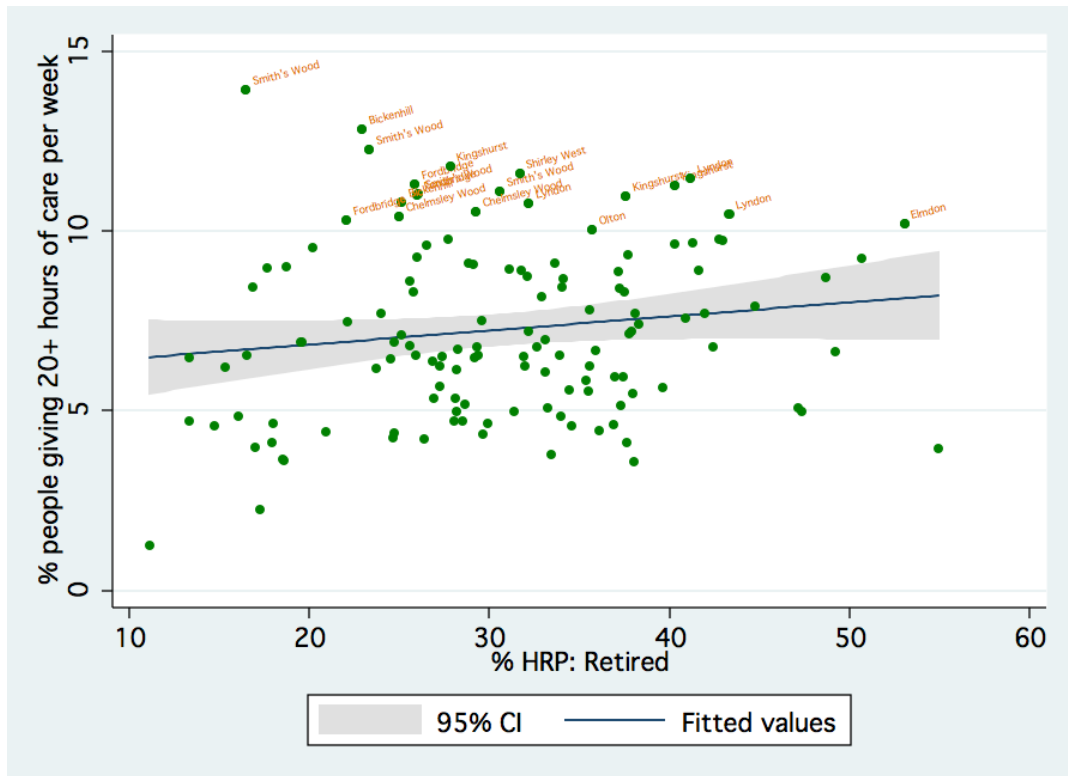
Figure 13: Proportion of persons giving more than 20 hours care per week compared to proportion of household response persons who are retired (Census 2001, LSOAs with higher than 10% heavy carers labelled by ward)

In summary the provision of informal care has the potential to significantly (and negatively) impact upon levels of health and wellbeing and, given the other health needs discussed below, the provision of support services will be of critical importance to SCT. When considering the

distributions of digital technologies it is therefore important to distinguish between these patterns as they may reflect substantially different kinds of carers and care needs with different proclivities and capabilities for accessing and using digitally mediated support services. The goal of the digital inclusion strategy must be to work on a principle of inclusion that is as wide as possible. The people with high care needs identified in this analysis (and high attendant needs for social support) may well not be those best able to benefit from digitally mediated services.

3.2.2 Mental health needs: Depression Diagnosis[13]

The Solihull JSNA identifies the commissioning of *community based health and social care services for common mental health conditions and to support people with serious mental illness to live independently in their homes* (p75) as a key priority especially given a relatively high rate of diagnosed depression in deprived areas and the relatively high rate of use of secondary mental health care services.
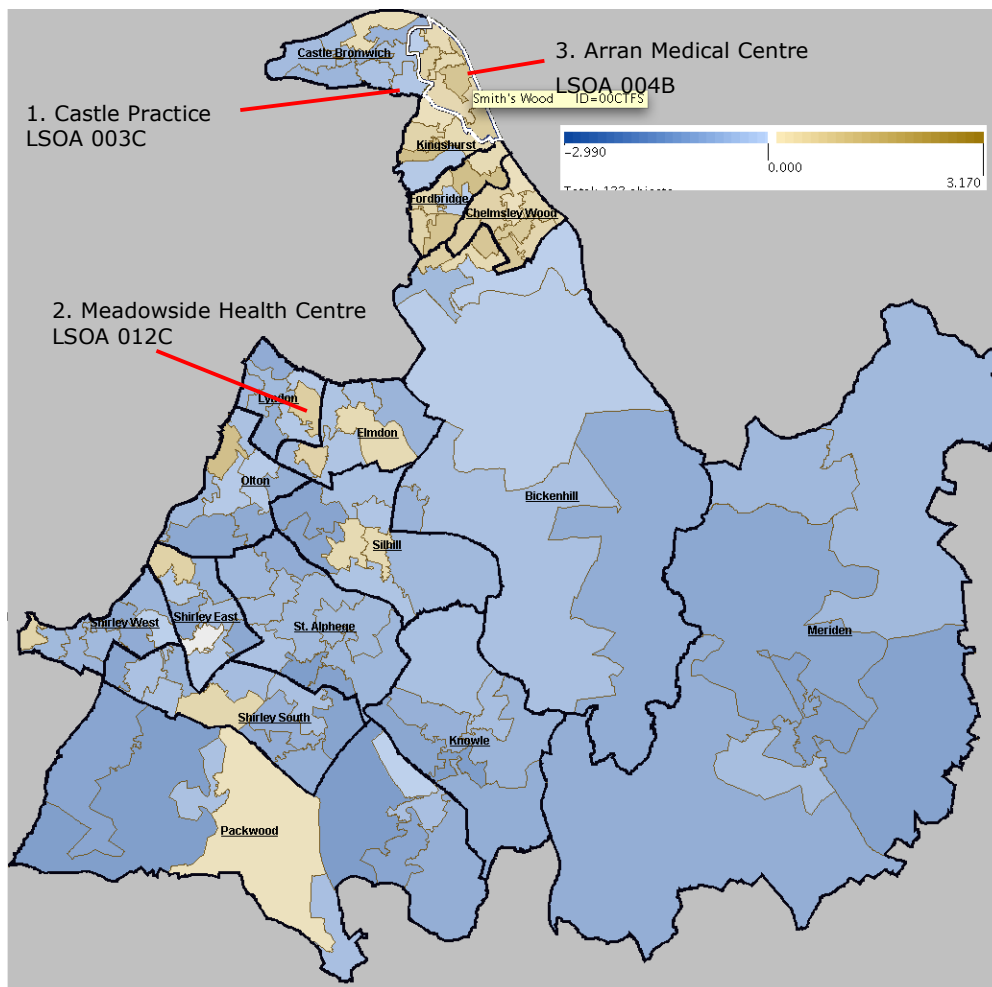
Figure 14: LSOA level IMD 2007 Mental Health indicator[14] score annotated with the locations of GP surgeries recording high prevalence of depression diagnosis.

Mental Health (Depression) in Castle Bromwich (LSOA 003C): QOF Measures

The area within SCT with the highest prevalence rates for patients with a history of depression (coded at any time) was in Castle Bromwich (LSOA 003C). The Castle Practice reported prevalence levels of 15.9%, which is 7.4% greater than the SCT average and 8.8% greater

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[13] Collated from Quality and Outcomes Framework (QOF) 2007/8 data (http://www.qof.ic.nhs.uk/index.asp)
[14] Measure of adults under 60 suffering from mood or anxiety disorders

than the national average.

Mental Health (Depression) in Lyndon (LSOA 012C): QOF Measures

The second highest prevalence rates for depression were reported at a GP practice in the Lyndon LSOA (LSOA 012C). This was the Meadowside Family Health Centre, which reported a prevalence rate for depression of 14.0%, which is 5.5% above the SCT average and 6.9% greater than the national average.

Mental Health (Depression) in Smiths Wood (LSOA 004B): QOF Measures

The third highest prevalence of depression was reported at a GP practice in LSOA 004B, Smiths Wood. The Arran Medical Centre reported a rate of 13.1%, which is 4.6% above the SCT average and 6% above the national average.

3.2.3 Mental Health Needs: Psychotic Diagnosis[15]

In contrast psychotic diagnoses are reported at a relatively lower prevalence rate and, according to the JSNA, this is similar to the national average.

As with depression, Figure 15 shows the location of GP surgeries with the highest rate of psychoses diagnoses with respect to the overall index of multiple deprivation.
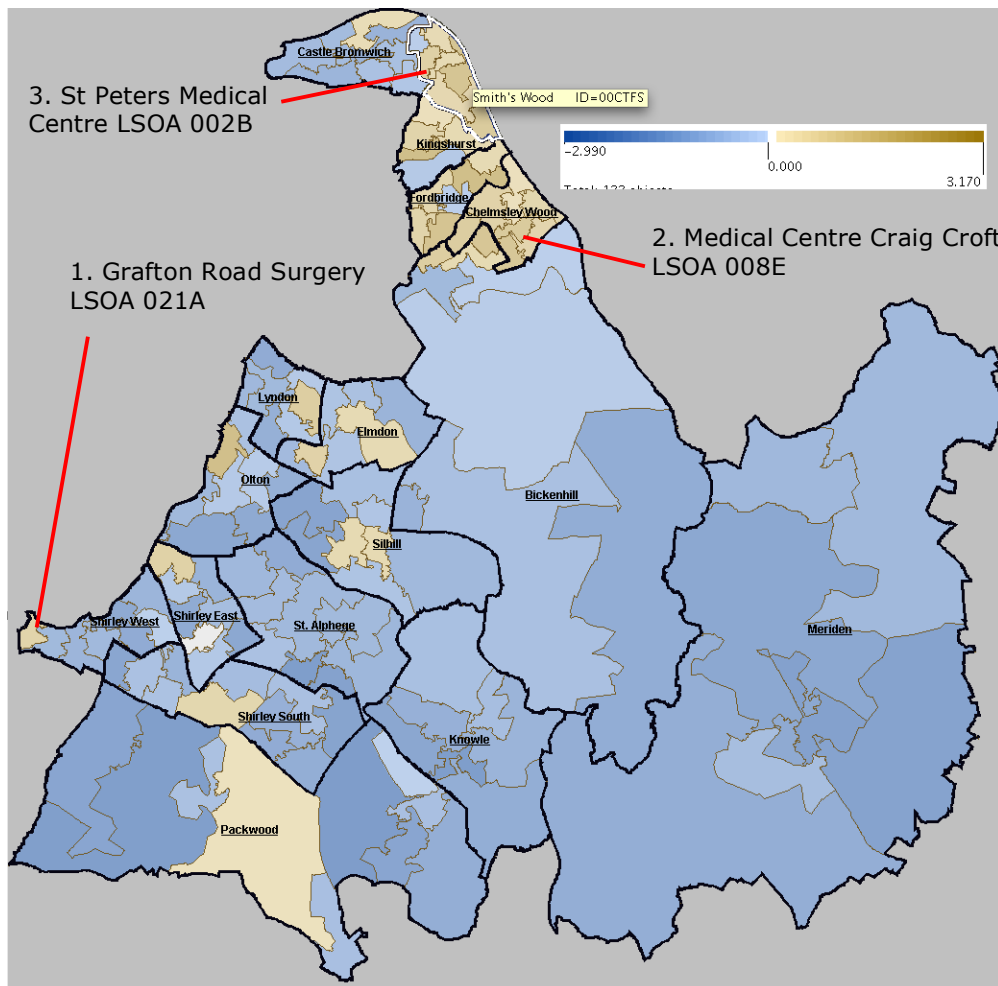
Figure 15: LSOA level IMD 2007 Mental Health indicator score annotated with the locations of GP surgeries recording high prevalence of psychotic diagnosis.

Mental Health (Psychoses) in Shirley West (LSOA 021A): QOF Measures

Within Solihull Care Trust, the GP practice with the highest registered prevalence of people with schizophrenia, bipolar disorder or other psychoses was located in Shirley West. Grafton Road surgery reports a prevalence level of 0.96% of all registered cases with a mental health

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[15] Collated from Quality and Outcomes Framework (QOF) 2007/8 data (http://www.qof.ic.nhs.uk/index.asp)

diagnosis. This figure is 0.36% above the PCT average prevalence, and 0.23% above national (English) average.

Mental Health (Psychoses) in Chelmsley Wood (LSOA 008E): QOF Measures

The second highest prevalence rates for schizophrenia, bipolar and other psychoses was located in LSOA 008E Chelmsley Wood (Medical Centre, Craig Croft) with prevalence rate of 0.92%, which is 0.32% above PCT average and 0.19%above national average.

Mental Health (Psychoses) in Smiths Wood (LSOA 002B): QOF Measures

The area with third highest prevalence rates was located in LSOA 002B, Smith's Wood. Here St Peters Medical Centre reported a prevalence rate for psychoses of 0.86%. This is 0.26% above PCT average and 0.13% above national average prevalence rates.

It is worth noting that two of these three areas (though not the specific LSOA's) were amongst the top three areas in terms of the overall IMD rankings (see Section 3.1 regarding Smith's Wood and Chelmsley Wood). When considered in light of their national IMD rankings, LSOA 021A (Shirley West) was ranked at 12404 nationally, which is close to the bottom third in the rankings. This would suggest levels of high material deprivation within Shirley West may be affecting the prevalence rates of psychoses. LSOA 008E, Chelmsley Wood had a national ranking of 2,359, suggesting very high levels of material disadvantage and this is reflected in levels of psychotic diagnoses. Similarly, Smiths Wood is ranked at 3043 nationally.

This is strong corroborative evidence of the inter-relatedness of high levels of deprivation and levels of mental health and wellbeing (Acheson 1998). A recent review of 168 analyses of income inequality and population health (Wilkinson and Pickett 2006) showed that for mental health indicators across eight developed countries there were significant correlations between income inequality and the prevalence of serious mental illness (i.e. psychoses). That is to say, the higher the level of income inequality, the higher the prevalence of mental illness, most notably amongst the most deprived groups (Pickett, James et al. 2006). This evidence points to the co-morbidity of deprivation and mental illness and highlights how any SCT DI strategy will need to be multi-modal in terms of how it addresses these constituent groups, such that the strategy can be seen to cut across issues of disadvantage, deprivation and their combined effects in relation to psychiatric morbidity.

It is also worth noting that only one area (and not the same LSOA) features across both diagnoses of psychoses and depression (Smiths Wood). In terms of the national picture in relation to the IMD rankings, Castle Bromwich (LSOA 003C) is ranked at 19424, which is middle range. This would suggest there are pockets of deprivation in Castle Bromwich which are impacting upon psychiatric morbidity in the area. These factors highlight the diversity of mental illness across SCT and also highlight the need for the SCT DI strategy to cater for differing degrees of severity in mental illness. It also demonstrates the connections between levels of deprivation and severe, enduring or episodic mental illness.

3.2.4 Demographic Priority 1: Children

For children, SCT's priorities are to support healthy lifestyles with a focus on obesity and sexual health and especially on teenage conception rates in the north of the area.

In terms of the population estimates, the 3 highest concentrations of young people by LSOA are 005C Kingshurst (where estimates indicate 30.1% of population are aged 0-15), followed by LSOA 005B Kingshurst (28.9%) and LSOA 028E Packwood (28.0%)[16].

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[16] For the JSNA, the three highest concentrations are Kingshurst and Fordbridge, Smith's Wood and Chelmsley Wood (based on ward data estimates from 2005).
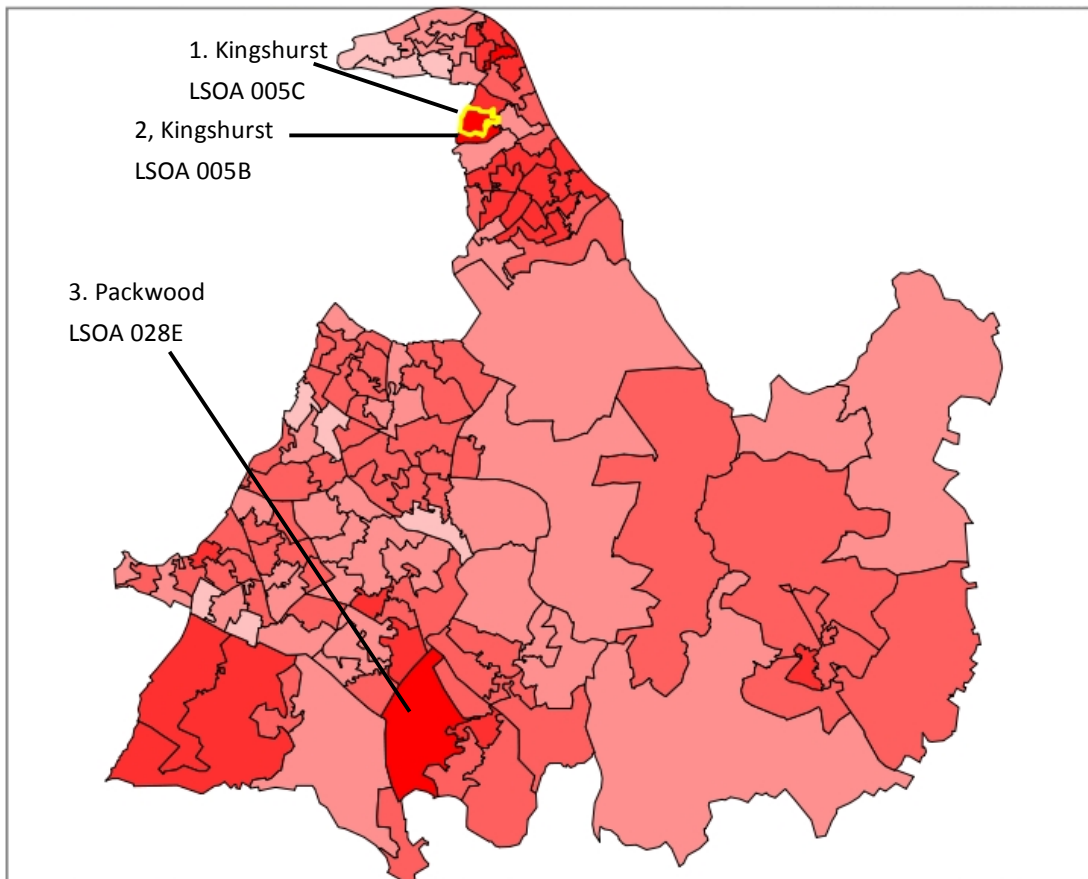
Figure 16: Percentage Population 0-15 by LSOA (ONS, 2007)

Children in Kingshurst (LSOA 005C): IMD 2007 measures

Out of the 133 LSOA's in Solihull LSOAs, Kingshurst LSOA 005C is ranked 6th highest in terms of the measures on the Indices of Multiple Deprivation with a nationally ranked score of 2754. This means it is within the 3000 most deprived areas of England, (the area with highest levels of IMD was Chelmsley Wood, LSOA 006A, with a ranked score of 2163).

In relation to health deprivation and disability indices, LSOA 005C was ranked at 5,892 in terms of the national ratings, (the worst area for health deprivation within Solihull LSOAs was LSOA 004B, Smith's Wood, with a health deprivation indices score of 2089).

For indices of Education Skills and Training[17], LSOA 005B had a nationally ranked score of 1247, which is low, and was the 5th lowest level in Solihull LSOAs, (the worst was Smith's Wood, LSOA 002D, with national rank score of 610). This figure indicates that Smith's Wood is an area of high education, skills, and training deprivation.

In terms of health indices, 20% of all claimants of Disability Living Allowance in LSOA 05C were aged 16 and under (the highest concentration of this population was in LSOA 024A, St Alphege with 40%).

In addition the JSNA report identifies areas in Kingshurst, Fordbridge and Chelmsley Wood as having teenage conception rates that are markedly (up to 100%) higher than the rates for England and Wales.

Children in Kingshurst (LSOA 005B): IMD 2007 measures

This LSOA annexes LSOA 005C. It is only slightly higher than its neighbour in terms of overall ranking on the IMD, being ranked as the area with the 8th highest levels of deprivation within Solihull LSOA, and a nationally ranked score of 3171.

In terms of health deprivation and disability indices, LSOA 005B was ranked second with the Solihull LSOAs, with a national score of 2928, which is a high score in terms of these indices.

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[17] This index is based on five sub-indicators: a) Average Key Stage 2, 3 and 4 point scores, b) Pupil absences, c) Adults with no or low qualifications, d) Young people (post 16) not staying in education and e) Young people (post 16, under 21) not applying for Higher Education.

For the measures of Education, Skills, and Training, LSOA 005B had a ranked score of 1598, which again, is a high score in the national context. In terms of DLA claimants, aged 16 and under, LSOA 005B had 13% of all claimants from this population group.

Children in Packwood (LSOA 028E): IMD 2007 Measures

Packwood is an area which has very low levels of deprivation. It is ranked at 30,782 in terms of the overall national IMD score, and in terms of health and disability deprivation indices it is ranked at 30,002. It does however show a 33% rate in terms of DLA claimants aged 16 and below.

In terms of the impact on services, both the health needs and the potential for digitally mediated services of areas with high concentrations of children are likely to be markedly different from the needs of, for example, +65 dominated LSOAs but also between deprived areas with high proportions of young people and those which are much less deprived.

With a desire to focus on healthy lifestyles and self-management of lifestyle choices, SCT will therefore need to take account of different digital access and skill levels of both children and their carers as well as differing requirements for healthy lifestyle support.

In terms of SCT priority areas, Table 2 summarises the most recent data available on issues of overweight and obese children. This data is not available at LSOA level[18], and the data presented here is at Care Trust level. It shows SCT is 0.7% above national prevalence rates for overweight children at reception level and 0.2% above national prevalence level for overweight children at year 6 level. In terms of childhood obesity, SCT is below national prevalence levels at both reception level and year 6 level.

Table 2: Comparison of SCT Childhood Obesity Prevalence rates with West Midlands and National Average

	SCT	**West Midlands**	**England**	Relation to Nat avg.
Overweight (reception)	13.6%	12.9%	12.9%	↑
Obese (reception)	8.5%	9.6%	9.6%	↓
Overweight (yr 6)	14.5%	14.3%	14.3%	↑
Obese (yr 6)	14.1%	18.3%	18.3%	↓

Source: West Midlands Public Health Observatory http://www.wmpho.org.uk/localprofiles/childrensbmi.aspx

Whilst in line with (or below) the national average prevalence rates, rates of overweight or obese children are still amongst the highest in Europe[19] and the DI strategy must address this. It is anticipated that a DI strategy in this regard might involve programmes designed around specific activities, such as pedometers or cycle computers and other such digital innovations designed to encourage participation in physical activity on the part of the children.

In relation to sexual health, a key indicator is the level of teenage conceptions. Data is only available for this on a local authority level. Solihull local authority has a teenage conception rate of 40.2 conceptions to women under eighteen years of age per 1000 women aged 15-17. This is marginally lower than the national rate of 41.7 and also lower than the West Midlands rate of 47.4. It has risen on the past two previous years so this would suggest that whilst not out of step with national levels, there is some upward movement on these prevalence levels and this would suggest that any DI strategy would have to identify means of communicating sexual health messages to this demographic group.

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[18] Currently it appears that the only small area obesity data that are publicly available are model based MSOA level estimates for adults produced by the National Centre for Social Research for 2003-5
[19] International Obesity Task Force - http://www.iotf.org/index.asp

3.2.5 Demographic Priority 2: Adults of Working Age

For this group SCT's focus is on reducing premature mortality from cardiovascular diseases and stroke, on smoking prevention/cessation, preventing obesity, alcohol abuse and future diabetes through lifestyle management services, targeting those areas of high needs or which are deprived to reduce inequality especially in the north of the area.

The three areas with the highest percentage populations of adults of working age in Solihull LSOAs are Packwood (LSOA 029C), Castle Bromwich (LSOA 001A) and Shirley South (LSOA 027D).

When split by gender Castle Bromwich had the highest concentrations (LSOA 001A, where 73.7% of all males were of working age, followed by LSOA 003A, where the percentage was 71.9%). This was followed by Packwood (LSOA 029C) where71.7% of all males were of working age. For women, the highest concentration was in Packwood (LSOA 029C) where 70.4% of the female population were of working age, followed by Shirley South (LSOA 027D) and Castle Bromwich (LSOA 001B) with tied percentage of 65.1%, then Bickenhill with a rate of 65%.
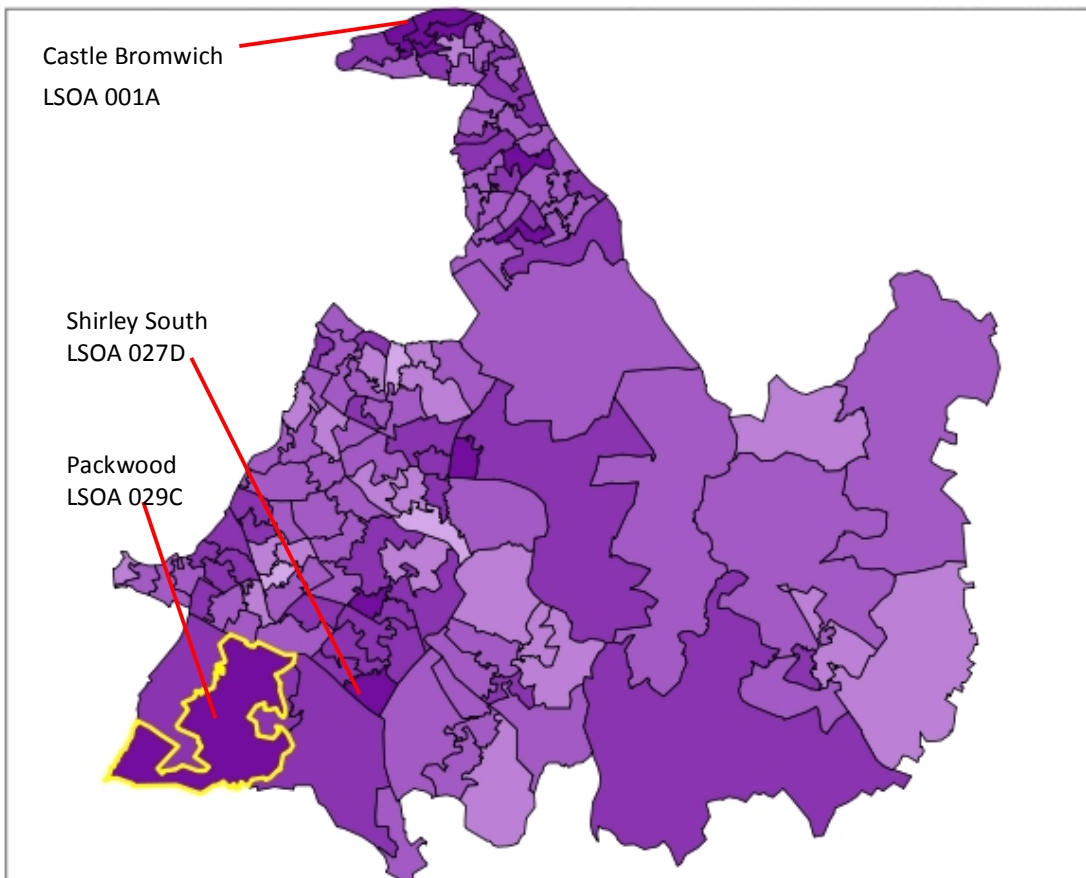
Figure 17: Percentage Population of Working Age by LSOA (ONS, 2007)

Adults of Working Age in Packwood (LSOA 029C): IMD 2007 measures

In relation to the Indices of Multiple Deprivation, the ranked score for LSOA 029C nationally was 28,131, indicating it is an area of very low levels of deprivation. Levels of employment in areas of high concentrations of working age populations are good indicators of deprivation. High rates of working age adults combined with high rates if unemployment would be indicative of deprivation. Additionally, high rates of working age adults and high rates of employment have implications for the mode and accessibility of service provisions (for example in terms of provision of out of hours access, or a digital inclusion strategy that might need to cater for the time constraints of a working population).

In Packwood, adult rates of employment mean that LSOA 029C Packwood is ranked nationally at 32,001, indicating it is an area of high employment. Smith's Wood (LSOA 004B had the

highest score for employment indices with a national ranking of 1214). In relation to the indices of health and disability deprivation, LSOA 029C Packwood was ranked 30,184 (i.e. low in terms of levels of illness and disability related deprivation) and for mental health indices[20] it reported a level of -1.44 (where SOAs national average is zero).

Adults of Working Age in Castle Bromwich (LSOA 001A): IMD 2007 measures

For Castle Bromwich, the overall IMD ranking scored LSOA 001A at 15,411. This indicates it is an area that has a higher score in the indices of deprivation that Packwood, but that this deprivation is mid-range (it is in the third quintile for all Solihull LSOAs). In terms of adult rates of employment, LSOA 001A is again mid-range, with a national ranking of 15,016. In terms of the indices of health and disability, Castle Bromwich was ranked 20,688, which is indicative of more health related deprivation than LSOA 029C. The mental health indices reported a level of -0.61, below the regional average.

Adults of Working Age in Shirley South (LSOA 027D): IMD 2007 measures

For Shirley South, the overall IMD ranking scored LSOA 027D at 30,556. Of the three areas of high working adult population concentrations, Shirley South scored lowest in terms of levels of multiple deprivation (the higher the score, the lesser the levels of deprivation). In terms of adult rates of employment, LSOA 027D had a national ranking of 29996. In terms of the indices of health and disability, Castle Bromwich was ranked 28703. The mental health indices reported a level below the regional average at -1.02.

In terms of aligning these demographic distributions with the stated needs of the JSNA, then it proved possible to draw data from the QOF data available from SCT GP surgeries. Using this data, it is possible to discern that SCT has an unadjusted[21] CHD prevalence rate of 3.6%. It is important to note that this figure relates only to reported cases and does not report the higher prevalence rates that may exist unrecorded in the community[22]. This compares to the QOF data for England 2009 data which highlights a prevalence rate for England of 3.5% and a prevalence rate for the West Midlands of 3.6%[23]. For hypertension, SCT has an unadjusted prevalence rate of 14.5%, compared to national figure of 12.8% and a regional figure of 13.8%. These findings suggest SCT is broadly in line with national and regional figures in relation ton to levels of cardiovascular disease. In relation to Chronic Obstructive Pulmonary Disease (COPD) then SCT has a prevalence rate of 1.5%. This corresponds to the prevalence rate for the West Midlands SHA (also recorded at a level of 1.5%), and the nationally reported prevalence level of 1.5%. Obesity showed an unadjusted prevalence rate of 8% for SCT, which compares to a national prevalence rate of 7.6%. However, SCT reports a prevalence rate lower than the West Midlands SHA, which reported a prevalence rate of 8.4%. For diabetes, SCT scored 0.1% above the national prevalence rates, with a score of 3.9%, but under the West Midlands SHA prevalence rate of 4.2%. All of these prevalence rates suggest that SCT is not too far removed from the national levels of these conditions.

The Health Profile Summary for Solihull MCD 2009[24] shows Solihull to be significantly better than the English average in terms of number of adults who smoke with a modelled percentage estimate of 20.1% compared to English average of 24.1%. There was no reported significant difference from English average for percentage of adults binge drinking (17.1% local versus 18.0% national). There was a significantly different negative score for physically active adults, with 7.6% reported as physically active in Solihull, compared to 10.8% nationally.

In relation to cancer, the Health profile survey details Solihull MCd with a rate of 109.6 early deaths related to cancer compared to 115.5 nationally[25] (this is not significantly different). In terms of cancer prevalence rates, according to QOF data, SCT has a prevalence rate of 1.5% for cancer, compared to 1.3% for West Midlands SHA, and 1.3% nationally, In relation to

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[20] The proportion of adults under 60 suffering from mood or anxiety disorders, presented as a derived score. The value 0 is approximately the average proportion across all SOAs in England.

[21] Unadjusted prevalence rates show these registers as a percentage of the total practice list size (all ages).

[22] It is also worthy of note that registers for diabetes, epilepsy, chronic kidney disease, obesity and learning disabilities are defined to exclude younger people

[23] Source QOF data from http://www.ic.nhs.uk/statistics-and-data-collections/supporting-information/audits-and-performance/the-quality-and-outcomes-framework/qof-2007/08/data-tables

[24] http://www.apho.org.uk/default.aspx?QN=HP_METADATA&AreaID=50325

[25] Directly age standardised rate per 100,000 population under 75 2005-2007

Chronic Obstructive Pulmonary Disease (COPD) then SCT has a prevalence rate of 1.5%. This corresponds to the prevalence rate for the West Midlands SHA (also recorded at a level of 1.5%), and the nationally reported prevalence level of 1.5%. Obesity showed an unadjusted prevalence rate of 8% for SCT, which compares to a national prevalence rate of 7.6%. However, SCT reports a prevalence rate lower than the West Midlands SHA, which reported a prevalence rate of 8.4%. For diabetes, SCT scored 0.1% above the national prevalence rates, with a score of 3.9%, but under the West Midlands SHA prevalence rate of 4.2%. All of these prevalence rates suggest that SCT is not too far removed from the national levels of these conditions.

Any digitisation of services must continue the programmes of work already being undertaken in terms of lifestyle and health behaviour management with SCT. It is apparent that the dominant mode within any digital inclusion strategy would be health promotion and health education in terms of lifestyle management. As such, any DI strategy would be best targeted for this group at educating people about their health behaviours.

3.2.6 Demographic Priority 3: Older People

The Joint Strategic Needs Assessment (JSNA) 2008 states that older people must be a major focus of SCT's services with a particular emphasis on conditions such as heart disease, stroke, diabetes, arthritis, falls/fractures, mental health problems (particularly dementia) and also support for carers (see also Section 3.2.1, page 13) where Solihull is perceived to be lagging behind.

In terms of the elderly population, the three areas with the highest concentrations of men aged 65+ and women aged 60+ plus were LSOA 016B Silhill, where 43.8% of the population are in this age group. This was followed by LSOA 011B Elmdon, (35.6%), then LSOA 014D, Olton with 34.3%. These three were closely followed by LSOA 018B Shirley East, with 33% in this age group, then LSOA 013D Olton.

Brief and preliminary sketches of each of these three main 'ageing population' health needs areas within each stream of the JSNA document will be laid out as a means of outlining the key characteristics of each public health topic in relation to physical locations and physical populations.
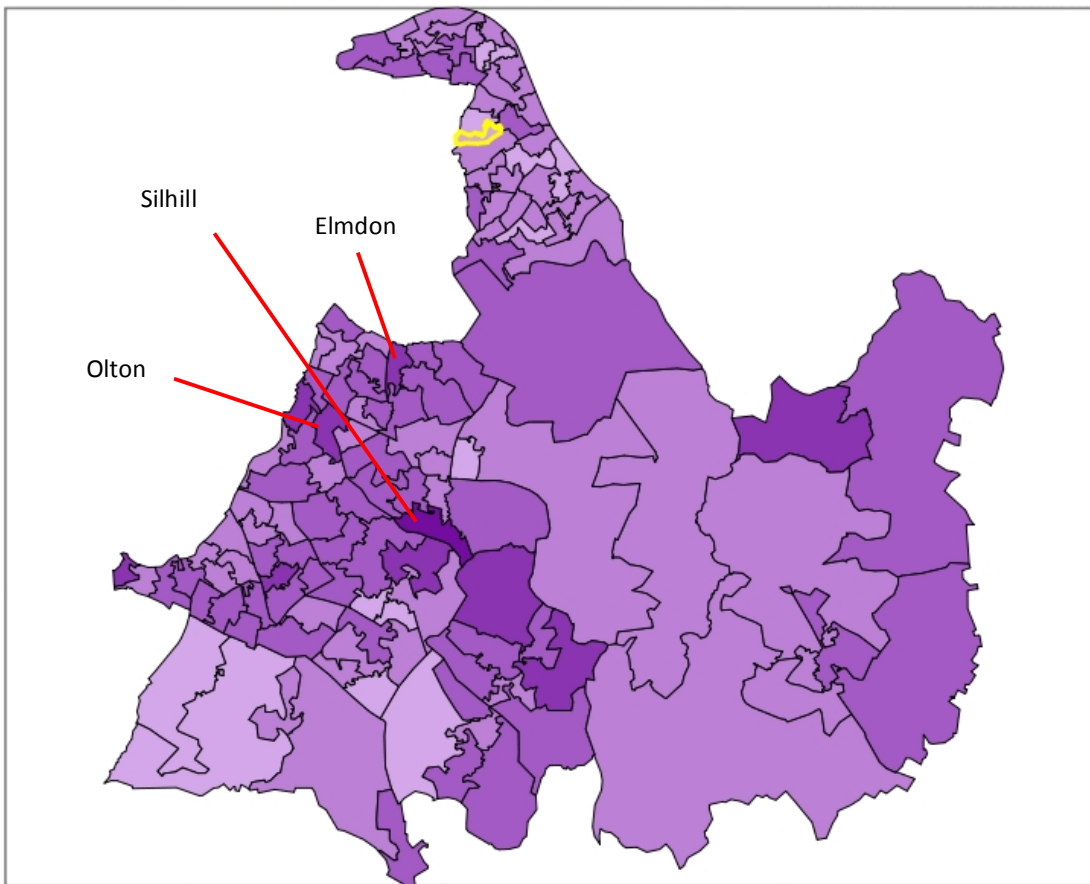
Figure 18: Percentage Population male 65+ and female aged 60+ by LSOA (ONS, 2007)

The elderly in Silhill (LSOA 016B): IMD 2007 measures

Silhill in terms of the national rank score for Health deprivation and disability has a rank of 19,493 (where a score of 1 equals the most deprived in England and a rank score of 32,482 equals the least deprived). In terms of income deprivation for older people it had a rank score of 20,335. Many of the health measures within the IMD are compiled in relation to disability benefit, which are employment related benefits. Given the post-retirement status of this population group, this means there is a paucity of data available.

For the Disability Living Allowance, 27% of claimants were 60-69, and a further 27% were aged 70+. There were 40 cases (out of 55 total) which had been for longer than 5 years duration[26]. With regard to mobility allowance[27], 36% were in receipt of the lower rate and 55% were in receipt of the higher rate. In terms of levels of care award, 36% of all DLA received a lower rate care award[28], 36% a middle rate care award and 09% a higher rate care award. These data are indicative of a population with long term limiting conditions. In 2001 census data 36% of population reported a long term limiting condition.

The elderly in Elmdon (LSOA 011B): IMD 2007 measures

Elmdon has a health deprivation and disability rank score of 21,842. In terms of income deprivation it is ranked at 21,439. For DLA, 23% of claimants were aged 60-69, and a further 15% of claimants were aged 70+. In terms of duration of claims, 50 had been for five years or

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[26] This includes all cases, above and below age 60

[27] There are two rates of the mobility component depending on how your disability affects you:
- the lower rate, if you need guidance or supervision out of doors
- the higher rate, if you have any of the other, more severe, walking difficulties

[28] There are three rates of care component depending on how your disability affects you:
- the lowest rate, if you need help or supervision for some of the day or you are unable to prepare a cooked main meal
- the middle rate, if you need help with personal care frequently or supervision continually throughout the day only, or help with personal care or someone to watch over you during the night only, or someone with you while on dialysis
- the highest rate, if you need help or supervision frequently throughout the day and during the night

longer, (out of 65 total). For all DLA claimants, 31% were eligible for the lower rate mobility award, and 62% were eligible for the higher rate award. In terms of levels of care award, 31% of all DLA received a lower rate care award, 38% a middle rate care award and 15% a higher rate care award. These data are again indicative of a population with long term limiting conditions. From 2001 census data 33% of the population in this LSOA reported a long term limiting condition.

The elderly in Olton (LSOA 014D): IMD 2007 measures

In terms of issues and health and deprivation, Olton features in the bottom quintile in terms of health deprivation and disability with the LSOA, with a rank of 21,330. It is also in the bottom quintile for the rank of income deprivation affecting older people with a rank score of 22,992 (where a score of 1 equals the most deprived in England and a rank score of 32,482 equals the least deprived). The lowest ranked LSOA in SMD for this variable was Chelmsley Wood (LSOA 008E), with a rank score of 1743, and an overall population size of this group of 18.1%.

Of all of those claiming Disability Living Allowance (DLA) in Olton, 29% were aged 60-69, and a further 14% were aged 70+. For all DLA claims, the number of 5+year claims was 15 (out of 90 cases). Furthermore, 29% of all Disability Living Allowance claimants received the Lower Rate Mobility Award[29], and 57% received the higher rate. In terms of levels of care award, 21% of all DLA received a lower rate care ward, 36% a middle rate care award and 36% a higher rate care award. These data are again indicative of a population with long term limiting conditions. In 2001 census data, 32% of population reported a long term limiting condition. The area with the highest reported levels of limiting conditions was LSOA 013D, Olton, with 48% self reported LTLCs.

From this evidence it appears that the areas within Solihull MD with the highest concentrations of 60+ populations are areas of relatively low deprivation. However, this would be to ignore LSOA 018B Shirley East, 33% 60+ population and IMD score of 1353, and LSOA 013D, Olton, which has 32% 60+, an IMD score of 1635 and relatively poorer geographical access to services. Additionally, the high number of higher rate care and mobility awards across all three LSOAs is indicative of a substantial need for services focused on older people, particularly in terms of care assistance. Digital Inclusions strategies for this particular group might be best tailored around issues of social capital and social support as a means of increasing and maintaining levels of general health and wellbeing. An area with high concentrations of elderly populations is more likely to contain higher populations of sole occupancy housing. Similarly, people who are retired may find it harder to develop and maintain affective relationships, particularly now they are outside employment (Pahl 2003). Also, the impact of a long term or limiting condition can have a serious impact on a person's ability to maintain friendship networks. Social support (loosely defined) can promote health and wellbeing in a very positive way. When people have satisfactory levels of social support (however these are judged) then they tend not to get ill, to have longer life expectancies or recover more readily if they do get ill (Pahl 2003). Stansfield (2006) outlines the positive impact that social support can have on mortality, physical morbidity, prognosis, mental health, social integration and social cohesion. This is not to say that social support is a panacea, the exact nature of the relation between social support, social networks and health and wellbeing is under-researched. However, it is apparent that there is an effect and that the elderly population of Solihull would be most predisposed to benefit from DI strategy interventions focussed around a wider social support context.

3.2.7 Summary

The evidence presented in the preceding section demonstrates the diversity of health care needs in SCT, particularly when considered in tandem with indices of deprivation. Areas of high deprivation also contain pockets of low or mild deprivation; areas with population concentrations of elderly people also contain pockets of younger people. The conclusion to be drawn from this is that there is a need for SCT to carefully consider it's patient and citizen service delivery and engagement strategies so that they are accessible and amenable to a diverse group of current (and future) patients and their carers across SCT. This means a cautious approach needs to be taken to the 'digitalisation' of these strategies.

Around issues of social care, it was shown that people engaged in social care tend to be in more routine and manual occupations. These occupations are also more insecure and more likely to be affected by seasonal employment patterns. Digitally mediated services in this context might be best tailored towards offering some form of social support and identifying suitable resources within different community settings that might be accessed to facilitate carers in maintaining their levels of care but also enabling them to continue in employment. If such services can be tailored towards increasing awareness and knowledge of direct payment schemes and individualised budgets, then it might prove possible for more service users to take more of a direct role in the provision of their care, whilst simultaneously easing some of the load from the unpaid voluntary carers (this also corresponds with a stated priority in the JSNA). As we will see, this group may not have high levels of access to the internet but it is anticipated that a high percentage would have mobile phones and digital television. These groups may be from what are traditionally regarded as 'hard to reach' populations and it might be that deployment of appropriate public patient involvement (PPI) programmes via suitable digital infrastructures and services, may function to engage people in a process of engagement with SCT. By encouraging and incentivising people (carers and service users) into contributing to the mode of service delivery in SCT, they may become more interested in the public health messages that a successful DI strategy would be looking to impart.

In relation to issues of mental health, it is difficult to disaggregate mental illness from other factors of deprivation. The evidence as presented suggests that the major mental health issues within SCT relate to lower levels issues of depressive related disorders. In conjunction with the social care population, this group might also benefit from informational activities which deal with issues of awareness about and involvement in direct payments schemes and individualised budget programmes. Similarly to the social carers group, this group of SCT users may traditionally have been regarded as a hard to reach group, and similarly to the carers, it might be a useful approach to assimilate issues of digital inclusion into the overall PPI strategy.

For the priorities identified in the JSNA in terms of child and adolescent health, then SCT is close to the target outcomes. It is only marginally higher than national and regional levels in relation to overweight children (at reception and year six) and is under these levels in terms of obesity. It is also below the national levels in terms of teenage conceptions, but as the JSNA identifies, there are pockets within SCT where teenage conceptions are 100% higher than national rates. From this evidence it is apparent that there is a strong need to engage children and adolescents around key public health criteria and it may be that the relatively higher usage levels of digital media (and especially it's frequent 'anti-establishment' positioning) in this group can be used to good effect. However, and this is an important point, the evidence presented in the preceding section on child and adolescent health identifies how levels of educational attainment generally are low in areas of high levels of IMD scores, most notably Kingshurst (LSOA 005B). As such, any public health message would need to be tailored to be accessible to areas with relatively lower levels of education, skills and training.

For the adults of working age population, the analysis presented here demonstrates that SCT is relatively close to national prevalence rates for the majority of the factors outlined in the JSNA. However, when these conclusions are considered in light of the other findings contained in this report, it becomes evident that there are pockets of high deprivation where levels of smoking, alcohol consumption and non-exercise are high. As such, any engagement strategy (whether digitally mediated or otherwise) will need to encompass both the less deprived working adult populations in order to maintain current prevalence levels, and also those deeply and persistently excluded who would benefit the most from programmes of lifestyle management and health behaviour change, particularly in regard to physical activity.

In terms of the elderly, as already discussed, they key issue would appear to be around social support and increased engagement with independent living programmes, through increased uptake of direct payments and individualised budgets (and this also has the benefit of assisting high volume voluntary carers). In addition the provision of 'virtual mobility' services to ease the increased social isolation associated with deteriorating health and mobility may be a useful avenue to pursue.

In conclusion, the key outcome of this section of the report is an awareness of the diversity of need across different population groups within SCT. Any public/patient service delivery and engagement strategy that is considering 'digital options' must address this diversity as well as

other aspects of diversity that the data has not considered such as different ethnic groups within SCT or differences in ways in which men and women access services. In addition, SCT contains pockets of high advantage and high disadvantage. Any strategy must incorporate different modes of 'digital provision', such that it is accessible by these different groups within the SCT, and this will require that the strategy is tailored for specific populations in terms of their access to and awareness of ICT and associated technologies. This is the topic that the next section of the report will address.

3.3 An overview of small area level ICT uptake in Solihull

Having established the general and specific patterns of social exclusion and health needs across Solihull, we turn now to comparable patterns of access to information and communication technologies in order to reach firmer conclusions on appropriate 'digital channels'.

Whilst national surveys such as the Expenditure and Food Survey discussed in Section 2.3 can provide data on ICT uptake at the national and, usually, regional level they provide no data on small area distributions on which judgements about place-based digitally mediated interventions can be based. In this section we draw on results from a number of recent University of Essex projects to briefly describe estimates of local ICT uptake and use using a spatial microsimulation method which combines the Expenditure and Food Survey with 2001 Census data (Anderson 2007; Anderson 2008)[30].
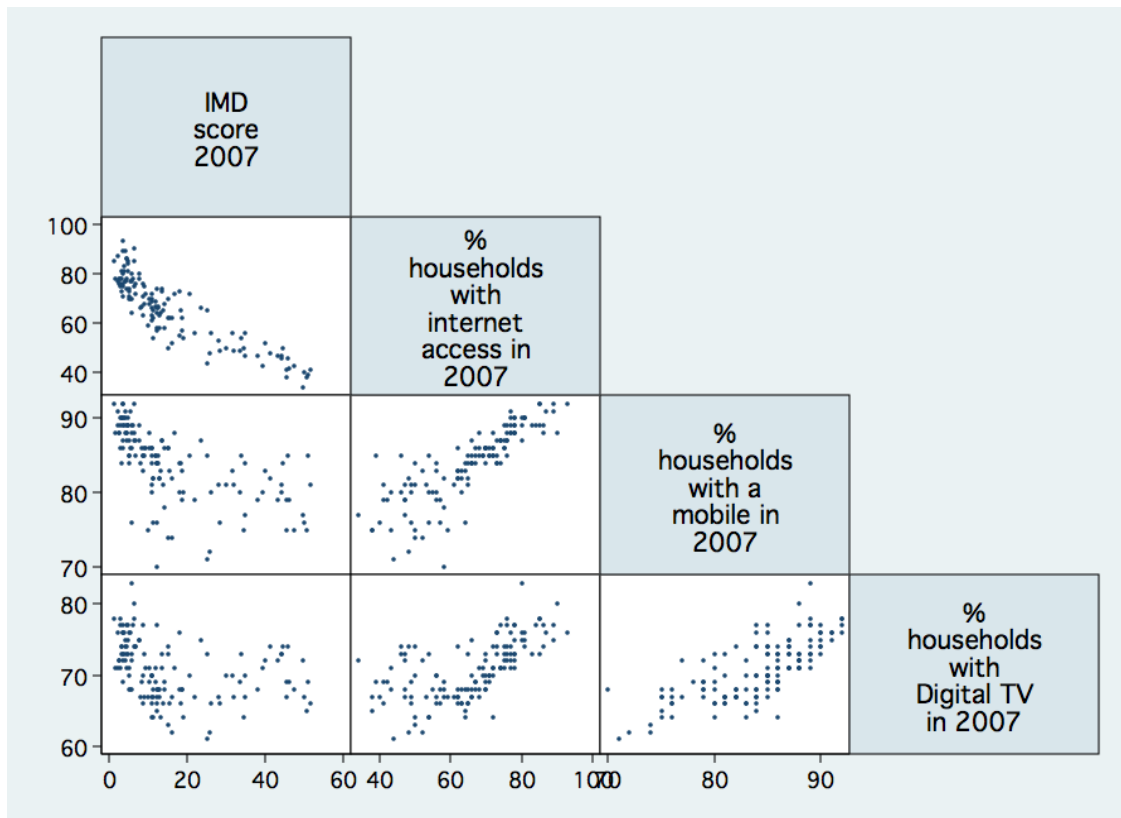
Figure 19: Estimated rates of LSOA level ICT uptake in Solihull (spatial microsimulation model using EFS 2007 & Census 2001) compared to overall IMD 2007

Figure 19 shows the correlation between uptake rates of the three access technologies

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[30] Clearly the socio-economic composition of some LSOAs in Solihull may have changed substantially since the last Census in 2001 and if this is the case then estimates for those LSOAs may be unreliable. This problem can be addressed by updating the spatial data on which the estimates are based either through projection modeling (see Anderson, B., P. De Agostini, et al. (2007). Time and Money in Space. 1st General Conference of the International Microsimulation Association, European Centre for Social Welfare Policy and Research, Vienna, Austria, 20 to 22 August 2007.) or through the use of more recent Census-like data drawn from ONS and other sources.

considered and the overall IMD 2007 scores for LSOAs in Solihull. As we might expect there are relatively strong positive correlations between the distributions of the estimated household technology uptake rates although in each case there is more variation at the lower end of the distributions. Thus some areas with low internet uptake have mobile telephony and digital television uptake rates which are in the middle of the distributions. Furthermore whilst there us a clear negative correlation between internet uptake rates and deprivation, there is far more variation for the other two technologies[31].
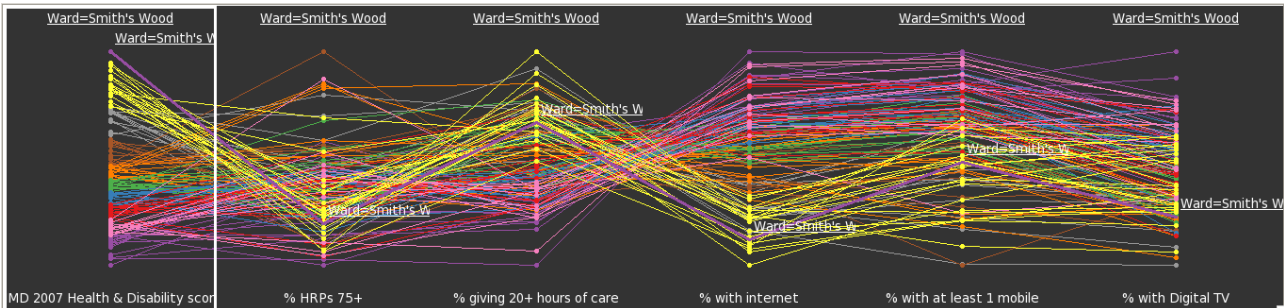

Figure 20: Estimated rates of LSOA level ICT uptake in Solihull (Spatial microsimulation model using EFS 2007 & Census 2001) compared to IMD Health & Disability Score 2007, % HRPs aged 75+ and levels of care

Similarly Figure 20 shows the relationship between the Health and Disability scores levels of care, prevalence of older (aged 75+) household response persons and area level estimates of technology access. In this chart each line/dot represents a single LSOA and the colours represent the distribution of LSOAs along the Health and Disability score axis (far left). The LSOA with the highest Health and Disability score (Solihull 004B in Smith's Wood) is labelled.

It is immediately apparent that whilst there is some correlation between areas with high health and disability scores and those with high levels of high care (see also Figure 8 on page 14 and the earlier comments regarding the non-correlation of old age and care distributions), the substantial crossing of the lines between the care and internet access axes shows a strong negative correlation at the area level. As we might suspect the pattern is then more stable but the degree of crossing indicates further negative relationships such as rather higher levels of mobile access in some LSOAs compared to internet access, with average levels of Digital TV uptake but yet very high health & disability scores (highlighted in green).

Only two LSOAs are in the lowest decile for all three technologies and whilst one (006a in Chelmsley Wood) has one of the highest IMD scores, the other (012B in Elmdon) is much less deprived (Table 3).

Table 3: LSOAs whose estimated internet, mobile telephone and digital television uptake rates are in the lowest decile for each.

District LSOA	Ward	IMD 2007 score	Health & disability score	% households with		
				internet access	mobile telephone	digital television
Solihull 006A	Chelmsley Wood	50.71	1.18	38	75	65
Solihull 012B	Elmdon	25.03	.51	44	71	61

In the following sections we show the overall spatial distribution of the estimated uptake of mobile phones, household internet access and digital television at the LSOA level. In each case we also show the relationship between these estimates and the health deprivation component of the 2007 Indices of Multiple Deprivation and also with the Census 2001 indicator of the proportion of people in each LSOA who gave different levels of unpaid care.

3.3.1 Estimated small area distributions of household internet access

Figure 21 shows the estimated distribution of households with internet access and as we might expect (Figure 22) there is a clear negative correlation with the level of health and disability

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[31] A spearman rank correlation between the IMD score and the estimated household internet uptake rate is -0.887 compared to -0.478 for the IMD score and the digital TV uptake rate.

deprivation although there are also suggestions that some areas of higher health deprivation may have higher than expected rates of internet access (Bickenhill 009B, circled).
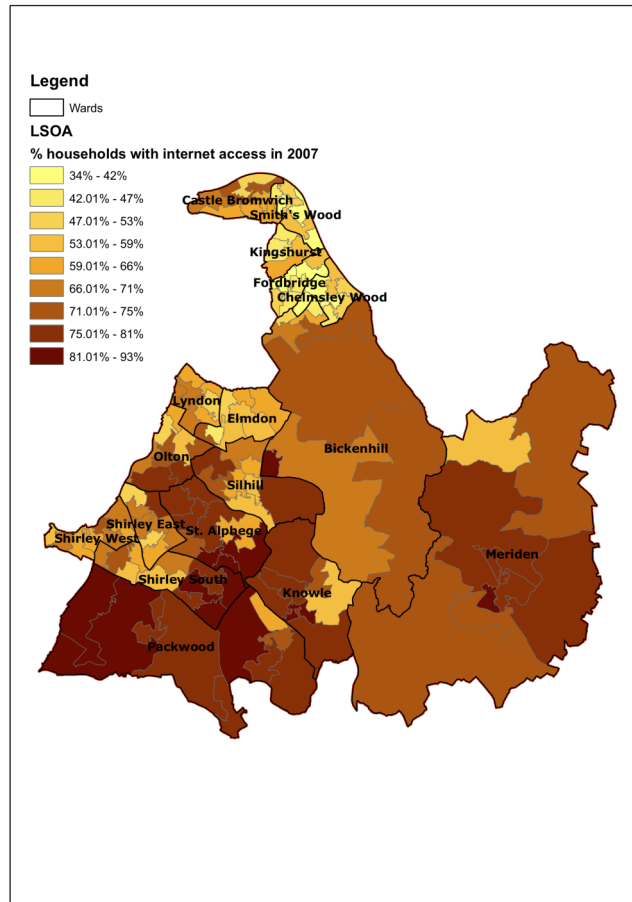
Figure 21: LSOA level estimates of the % of households with internet access in 2007 (Spatial microsimulation model using EFS 2007 & Census 2001)

Figure 22: LSOA level estimates of the % of households with internet access in 2007 (Spatial microsimulation model using EFS 2007 & Census 2001) compared to IMD 2007 Health & Disability scores
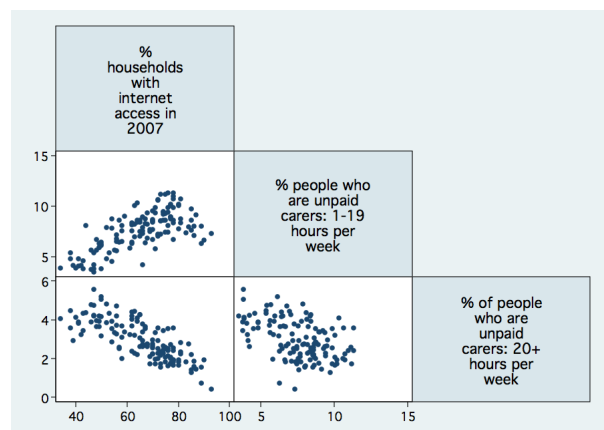
Figure 23: LSOA level estimates of the % of households with internet access in 2007 (Spatial microsimulation model using EFS 2007 & Census 2001) compared to Census 2001 'unpaid care' levels.

More interestingly however Figure 23 demonstrates that LSOAs with higher rates of low

amounts of unpaid care are also likely to be those with higher internet uptake rates, the opposite is the case for LSOAs with higher rates of high unpaid care (lower left scatter graph). Thus e-Health services for areas where there are high proportions of 'heavy' carers and for the areas where there are higher rates of poor health and disability may therefore need to consider service delivery 'channels' other than household internet access.

3.3.2 Estimated small area distributions of mobile telephones

Figure 24 shows the estimated distribution of households with at least one mobile telephone in 2007 whilst Figure 25 and Figure 26 show the relationship between this estimate and the IMD 2007 Health and Disability score.
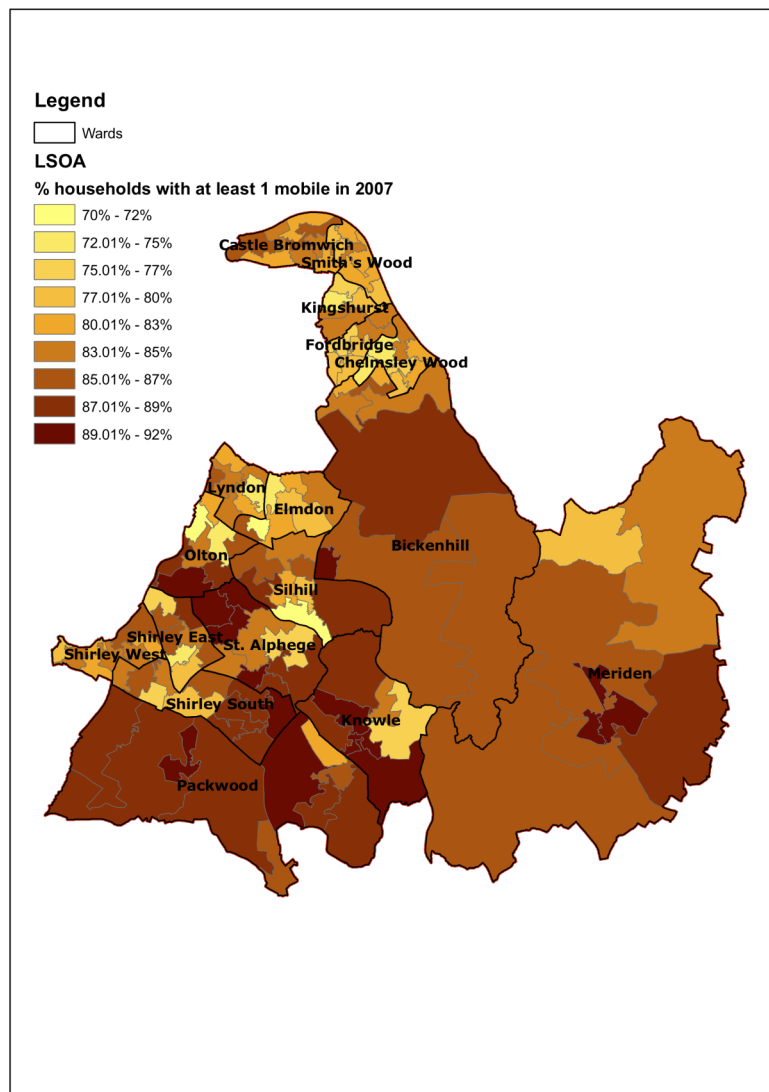
Figure 24: LSOA level estimates of the % of households with at least one mobile telephone in 2001 (Spatial microsimulation model using EFS 2007 & Census 2001)

The distribution of mobile telephony reflects area level patterns of deprivation to some extent and this is particularly true in zones of least health deprivation where, as we might expect, high levels of mobile ownership are likely to be found. However there are also many zones where health deprivation is high but mobile uptake rates are also relatively high.

As before there is a negative correlation between levels of mobile telephony and levels of 'heavy' care but it is less clear than for household internet access with some of the areas with

the highest rates of 'high' care also having relatively high rates of mobile uptake (in Solihull 004B (Smith's Wood), Solihull 005B (Kingshurst) and Solihull 006D (Fordbridge) – all circled)
.

Figure 25: LSOA level estimates of the % of households with at least one mobile phone in 2007 (Spatial microsimulation model using EFS 2007 & Census 2001) compared to IMD 2007 Health & Disability scores
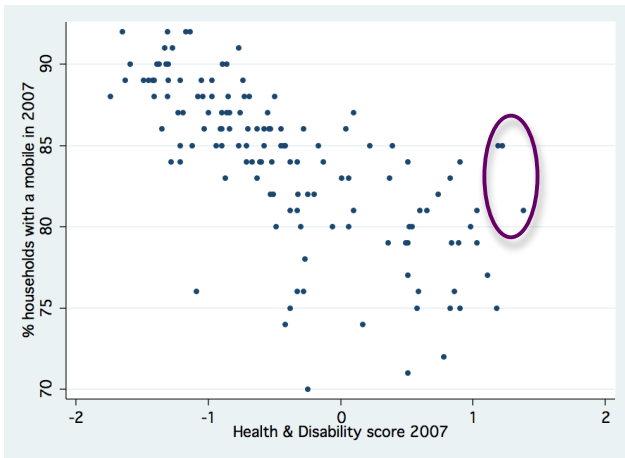
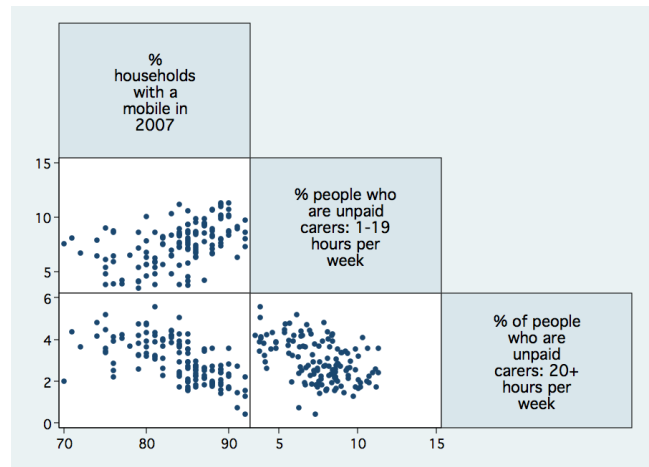**Figure 26: LSOA level estimates of the % of households with at least one mobile phone in 2007 (Spatial microsimulation model using EFS 2007 & Census 2001) compared to Census 2001 'unpaid care' levels.**

3.3.3 Estimated small area distributions of digital television

Figure 27 shows the estimated distribution of households with digital television in 2007 whilst Figure 28 and Figure 29 show the relationship between this estimate and the IMD 2007 Health and Disability score.

As was noted above the distribution of digital television uptake is likely to be less strongly correlated with patterns of both overall and health and disability deprivation. Figure 27 reflects this by showing the relatively higher uptake in areas such as Chelmsley Wood compared to Elmdon and Lyndon and this is also supported by Figure 28. Whilst there is little relationship between the uptake of digital television and high rates of low level care, those areas with higher rates of high level care tended to have lower rates of estimated digital television uptake with the exception of a few outliers.

Figure 27: LSOA level estimates of the % of households with Digital TV in 2001 (Spatial microsimulation model using EFS 2007 & Census 2001)
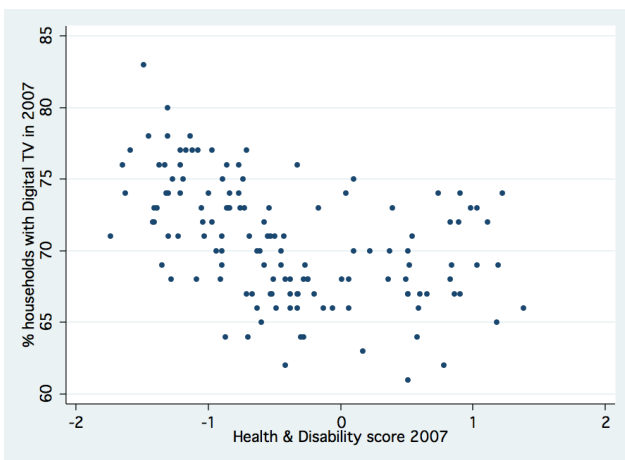
Figure 28: LSOA level estimates of the % of households with Digital TV in 2007 (Spatial microsimulation model using EFS 2007 & Census 2001) compared to IMD 2007 Health & Disability scores
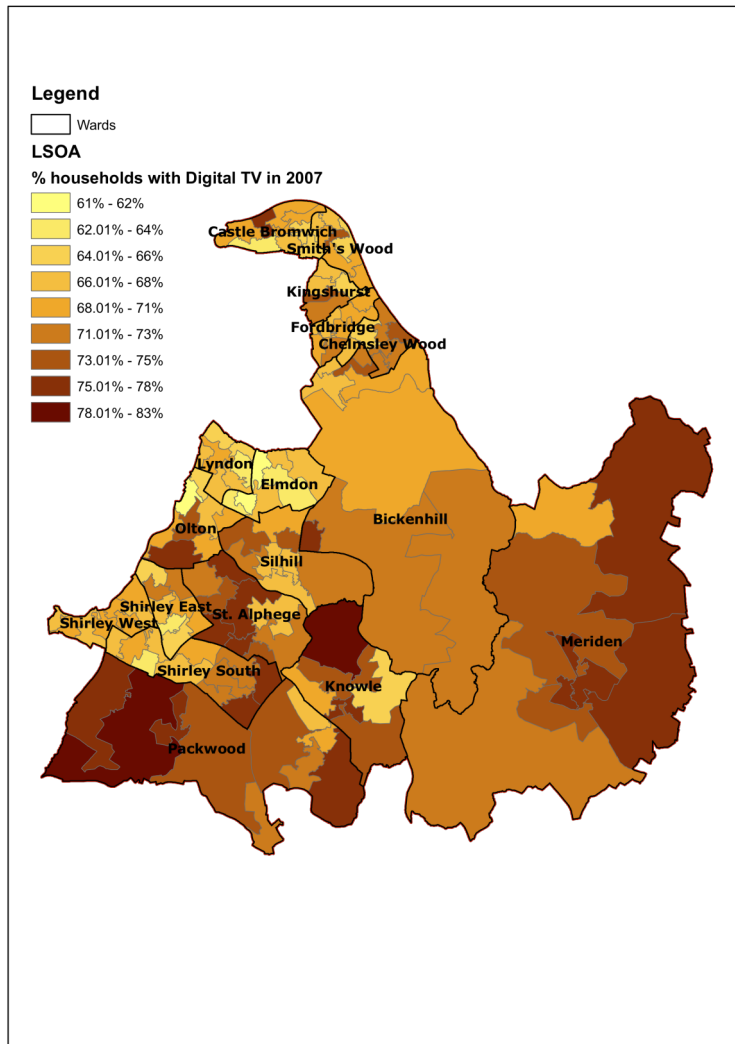

Figure 29: LSOA level estimates of the % of households with Digital TV in 2007 (Spatial microsimulation model using EFS 2007 & Census 2001) compared to Census 2001 'unpaid care' levels.

3.4 Summary

Overall then we can see that patterns of social exclusion (multiple deprivation) and health needs have some correlation with estimated patterns of access to some digital technologies. However this analysis also suggests a number of potential avenues for targeting specific technologies for use in specific health services for specific groups of people. Thus whilst lifestyle management services may be deliverable via PC based household internet access for some areas, in others different technologies may be required such as Digital TV or mobile telephones.

Whilst it is outside the scope of this report, future analysis could consider the prevalence of different access technologies in the three social groups discussed above – do areas with higher rates of young people have lower rates of internet access but higher rates of mobile telephony adoption for example? Further it would be important to consider levels of education and training participation in these analyses and also to take account of the likely distribution of next generation broadband services[32].

4 SOCIO-TECHNICAL DEVELOPMENTS IN E-HEALTH(CARE) AND SOCIAL INCLUSION

Having established the inter-relationship between social exclusion and digital technologies, mapped out the priorities for Solihull and discussed some estimates of access to digital technologies, we turn in this section to a review of current socio-technical and 'Digital Society'

research results which could be applied and/or developed further to address SCT's strategic healthcare priorities. In this we draw on a number of recent research reviews, research programmes, the wider academic literature, and also on our involvement in a number of advanced Government (Technology Strategy Board) funded 'Assisted Living' Initiatives. As we can see from Figure 30 these research and development initiatives follow a reasonably traditional conception of health and telecare with a focus on the relationship between different aspects of formal care services and the

Figure 30: The Technology Strategy Board's Approach to Assisted Living

individual (see also the projects listed in Annex A). The wider social context of kin, peer, social and community networks as well as the role of other mediators of health are generally underplayed[33].

As a response to this, we present our analysis through a framework that draws on the first three of Greenhalgh's four perspectives on Public Patient Involvement (PPI) in chronic illness: self-management, coping with illness and whole systems approaches (Greenhalgh 2009). Clearly there are overlaps between these perspectives but we have found the contrasts to be helpful in clarifying underlying issues of social exclusion and, by extension the potential for digital mediation. In each case we highlight potential links to SCT's key priorities and provide suggestions for fruitful future research and development activities.

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[32] See http://www.thinkbroadband.com/news/4004-bt-speeds-up-fibre-rollout.html for example.

[33] In part this may be due to the somewhat arbitrary distinction made between health care provided by the NHS and which is free at the point of use and social care which is provided by local authorities and is generally not free.

4.1 Self-management

In this perspective the patient is actively involved in managing their condition in a re-specified version of conventional medicine so that (it is hoped) patients will make their own informed choices about their condition or illness (or lifestyle) based on the provision of information or support services/interventions. This approach is therefore dominated by the medical profession who are concerned primarily with the potential of PPI to increase the preventative health behaviours amongst patients and the broader public. It sits most comfortably within a New Public Health agenda, predicated on regulating health behaviours and lifestyle practices and supporting patient rights to access information about themselves and their treatment. This form of PPI can also be seen to impact upon the quality of services available in the NHS with informed patient choice assumed to act as a driver for improving services. Lastly this approach is presumed to reduce the associated costs of treatment, either through patients taking on tasks previously conducted by professionals (such as diabetics monitoring their own blood sugar levels) or by being given direct responsibility for their own care budgets (such as direct payments).

It is worth noting that social inclusion is not a feature of these processes, the emphasis is very much on a two way relationship between patient and practitioner and an individualised conception of choice and autonomy founded on clinical rather than social criteria. The implication is that PPI, in this perspective, will work for those who are not socially excluded and who have the appropriate levels of literacy and self-efficacy. By extension, to the extent that self management PPI is increasingly digitally mediated and delivered (through online self-management systems or information repositories), there is an ongoing risk that those most in need will also be the least able to engage with this form of PPI.

Indeed, as Greenhalgh and others have noted there is at best disputed evidence to support the rationales driving this approach. Whilst there is evidence that some psychological outcomes are positively affected as are some medical conditions (diabetes, asthma) there is little evidence of reduced use of professional health services (i.e. reduced costs) and of its appropriateness for patient groups who are socially and economically deprived, or who may have low levels of numeracy, health literacy and self-efficacy (activation) to start with(Hibbard, Peters et al. 2007). Further research has also suggested that whilst access to a wider range of health information from various sources can help specific groups to feel more empowered (especially young people) to date there is little evidence that this changes the degree to which authority and responsibility for condition management is seen to rest with the practitioner and not the patient (Nettleton and Burrows 2003; Nettleton, Burrows et al. 2004; Wyatt, Henwood et al. 2005; Cullen 2009). Indeed the 'pressure to become more informed' can be perceived as deeply threatening by patients for whom 'choice' is an inappropriate concept in health care provision and in reality is rarely experienced (Green, McDowall et al. 2008).

However if we consider self-management in interventions which are less to do with informed choices but more to do with prompting behavioural change, the social and medical sciences literature is awash with preliminary reports of trials ranging from SMS (text) based obesity reduction programmes (Patrick, Raab et al. 2009) to virtual-worlds based smoking cessation programmes (Woodruff, Conway et al. 2007) and online access to cognitive behavioural therapy to alleviate depression and anxiety (Stuhlmiller and Tolchard 2009).

In the case of the smoking cessation study for example, the use of a trained smoking cessation counselor or facilitator to interact with smokers in a virtual world chat room[34] showed immediate post-assessment/activity effects but after 1 year the effect vanished. After this time the only predictor of permanent cessation was the number of times the smoker had previously quit suggesting that longer term boosters or other forms of support may also be needed a finding supported by more recent studies.

As a second example Stuhlmiller and Tolchard suggest that there is some evidence of the efficacy of online cognitive behavioral therapy in conjunction with consultation and guidance from MA level RNs and that there are significant potential cost savings.

Overall preliminary findings from an ongoing European Commission funded review (Cullen 2009) as well as a recent review of 'reminder systems' (Fry and Neff 2009) has suggested that

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[34] Implemented using ActiveWorlds - http://www.activeworlds.com/

to date evidence on the efficacy of many such interventions is still scarce. However a recent systematic review suggests that in the nine rigorous studies analysed, some outcomes do appear to improve in some childhood illnesses (especially better symptom control for asthma and reduced body weight/fat levels for obesity) when internet-based self management services are used (Stinson, Wilson et al. 2009). In addition they found some evidence for long-term cost savings due to decreased morbidity although the internet-based services were (with the current technology) more expensive to provide in the short term.

4.2 Coping with illness

In this perspective the context widens to consider support groups that use the telling of stories and experiences as a means of helping the group members share and explore the common aspects of their illness experiences. The emphasis is still a consumerist or patient one (Speed 2006) whereby the medical basis of the conditions is left unchallenged. The focus is very much on working with professionals and providers to improve services and to improve health behaviours amongst the constituent patient group. As such, there is again little emphasis on processes of inclusion and exclusion as the perspective is not concerned explicitly with any direct conception of inequality. However in practice the ability to access and engage with support groups is inevitably mediated by a range of factors including personal mobility, activation and, in the case of online support groups both access to appropriate technologies and the skills and confidence to use it.

As we have noted there is clear evidence of the effect of social support on health outcomes. Recent results show that increases in social participation (social capital) can have significant mediating effects on mental and physical health (Cattell 2001; Kritsotakis and Gamarnikow 2004; Mohana, Twigg et al. 2005), especially for those not in work and especially for women although there is little evidence that increasing social capital can negate more fundamental structural inequities in health (Pevalin and Rose 2003).

This finding is supported in part by a recent English Longitudinal Study of Aging report which shows that whilst social and civic participation declines with age it does not drop sharply except when an individual starts to experience poor health (Marmot, Banks et al. 2003). At this point we might expect that services to support continued social interaction and participation whilst not demanding personal mobility may have distinct health benefits for older and less mobile persons.

There is therefore great hope for the role of internet and related networking technologies to support such 'communities of interest' and to enable them to provide both 'binding' (i.e. emotionally supportive) and 'bridging' (i.e. access to new information and knowledge) social capital. However there has been relatively little direct analysis of the health benefits of participation in them (Cullen 2009) although Lindsay et al report positive effects in a small scale study of CHD sufferers in a deprived area of Salford[35] (Lindsay, Smith et al. 2007). In part this may be a result of their (still) nascent nature (Cullen 2004; Purdy 2008) but it is also undoubtedly because assessing their value involves difficult design with the need for matched groups with similar health issues of whom one group does not use or have access to the ICT mediated group and one that does. The lack of such studies is a noted weakness in the current evidence base (Lasker 2005) although it is being addressed to some extent by the Department of Health's Whole System Demonstrators programme [36] which "is believed to be the largest randomised control trial of telecare and telehealth in the world to date".

Cullen (2004) also notes that yet again the key socio- cultural variables that appeared to affect utilisation of such groups and networks were literacy; technical competence; socio-economic background; sense of citizenship and community loyalty and mobility although they noted the value of creative activities as part of support services. Their study, which included information provision by healthcare services as well as knowledge systems constructed by the patients and service providers in collaboration, suggested that there was a critical need:

o   To develop new methodologies that can capture tacit and anecdotal knowledge.

o   To reflect the 'communicative practices' of users and bridge their services and functions

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[35] See http://www.heartsofsalford.net/
[36] http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_100946

        directly with the users' lifeworlds

- o To provide content that is produced in formats that is meaningful, accessible and intelligible for target users (for example by using narrative formats and visual representations)

However as previously mentioned, recent work has suggested that whilst higher income/education internet users are still more likely to search for health information, lower socio-economic status groups and those in poor health are more likely to use peer groups/online forums (Atkinson, Saperstein et al. 2009) as are those who tend to exclude themselves from face-to-face interactions such as those who suffer mental illnesses (Klemm and Hardie 2002). Given that research such as Lasker's (Lasker 2005) has shown that such networks can be "particularly valuable for those who are newly diagnosed and in need of health information" and can help them to make "sense of bewildering symptoms, reconstruct[ing] order, and maintain[ing] control over life", investing in the support of such networks may reduce the subsequent need for other kinds of care. This is especially the case when it seems that active participation in discussion is not required, simply reading ('lurking') also provides substantial benefits (van Uden-Kraan, Drossaert et al. 2008).

4.3 Patients and citizens as partners

Having considered the self management approach where the onus is on the relationship between the individual and the service provider and then the 'coping approach where the onus is on the individual and their support networks, we turn finally to perhaps the most complex 'whole system' approach in which patients and citizens are seen as partners in the 'co-production' of health.

This approach, which should not be confused with the Department of Health's 'Whole System Demonstrators', draws from a model of social ecology, which regards chronic illness as the result of a range of interactions, across factors like prevalent health policies, material conditions, levels of social support and cohesion, health literacy and cultural norms, within a complex system, across a period of time. The resonances to our introductory discussion of social exclusion in a health context (c.f. Figure 1) should be clear.

The first two approaches (self management and coping) are simply about the illness, their key and primary concern is how the patient can become involved in managing and coping with their illness (the better they manage and cope the quicker they get better and the less they cost in terms of treatment for their conditions). Within the whole systems approach, the wider role, import and influence of other social and environmental factors are brought to bear as interventions move out from the clinic and into the community (Greenhalgh 2009). It is in this perspective that the potential for more inclusive processes and practices becomes more apparent and it is the approach lauded in many respects by reports such as that derived from the NHS's own 'Armchair Involvement' project (Wilson and Casey 2007). Greenhalgh argues that PPI, in a whole systems perspective, becomes more about citizen engagement and about processes of citizenship itself. Engagement means that informed and empowered individuals look after themselves better and indeed in the optimum case never become 'patients' at all. This is not that far removed from principles of law and ethics identified in the previous two approaches, the key difference is that the project is a social one, directed at all citizens, as opposed to the previous one, which was addressed only at those 'sick' patients.

If PPI is to work within a whole systems perspective then it has to be contingent upon making sure all citizens are informed, empowered and engaged. As we have seen there are structural reasons why some citizens (and perhaps the majority of *patients*) may be lacking in the capabilities required but may also simply not wish to do so even if they are able to. Within this model, Greenhalgh also proposes that PPI become part of a wider citizenship project, such that 'socially aware individuals contribute to community action because the health of all is perceived as a public good,' (p. 629). Here we see the potential for issues of health and wellbeing to intersect in a community setting, such that health inequality and social exclusion might be jointly tackled.

Early examples of this approach in practice have utilised a whole systems approach to extend a PPI self management programme towards improving levels of social cohesion and social capital (Jordan, Briggs et al. 2008; Osborne, Jordan et al. 2008). Their approach explicitly considers

different approaches to self-management activity from the individual to the population levels (e.g. from 1-1 consultation through group sessions and peer networks to 'public' media) and requires the interlinking of educational, health and support services across the different providers.

Extending this approach, Jonas et al (2006) discuss how the 'traditional' medical concern with pathology has failed in terms of long term and limiting conditions. They argue a whole systems approach is needed to capture the "complex, multi-factorial nature of most chronic disease, which does not allow for simple causal inference or for simple therapeutic interventions," (p. 315). In order to capture this complexity, it is necessary they argue to consider the sociocultural, psychological and behavioural, clinical (diagnosis based), and biological contexts. Activities to engage patients and increase social capital can be designed in such a way as to encompass these criteria across the different contexts. In a similar vein, Newbould et al (2006) state that in responding to the impacts of population levels of chronic illness, "the requirements of particular communities should be carefully assessed to fashion appropriate local responses. Factors to be taken into account include the sociological (as well as the economic and epidemiological) characteristics of given communities, the nature of the existing resources available to chronically ill people in the community, and the acceptability of professional as well as user-based interventions for supporting self-management," (p.261). Again a community level focus fits in with wider policy moves to engender increased engagement and participation through social capital building activities (see Communities and Neighbourhoods initiatives within the Department of Communities and Local Government[37]).

In summary Greenhalgh, Osborne et al and others (Kennedy, Reeves et al. 2007; Kennedy, Rogers et al. 2007) all point to the potential benefits of multilevel interventions that engage patients and citizens as partners. Inherent in these approaches is the use of multiple channels for different purposes in the overall care context but, as we have noted, access to and engagement with these channels is not necessarily socially equitable.

5 DISCUSSION

This section draws together the preceding discussions by discussing specific areas of health priority (as identified in the SCT JSNA report) and considering them in the light of the evidence discussed. This is done in terms of the overall wellbeing framework discussed at the start as a means of summarising the document and proposing possible future directions for SCT in terms of the overall digitisation of services.

5.1 Child and Adolescent Health Priorities in JSNA

In terms of child and adolescent health, the JSNA states that the main causes of obesity within this population group can be attributed to "…the establishment of unhealthy lifestyles and behaviours in young people; surveys show that patterns of smoking, drinking alcohol, poor diets and low levels of physical activity become established as young people develop," (JSNA, p.9) The JSNA concludes that in order to address issues of obesity then the priority for SCT must become focussed on providing "Services to support young people to adopt healthy lifestyles, focussing on preventing and treating obesity," (p. 10).


[37] http://www.communities.gov.uk/communities/about/
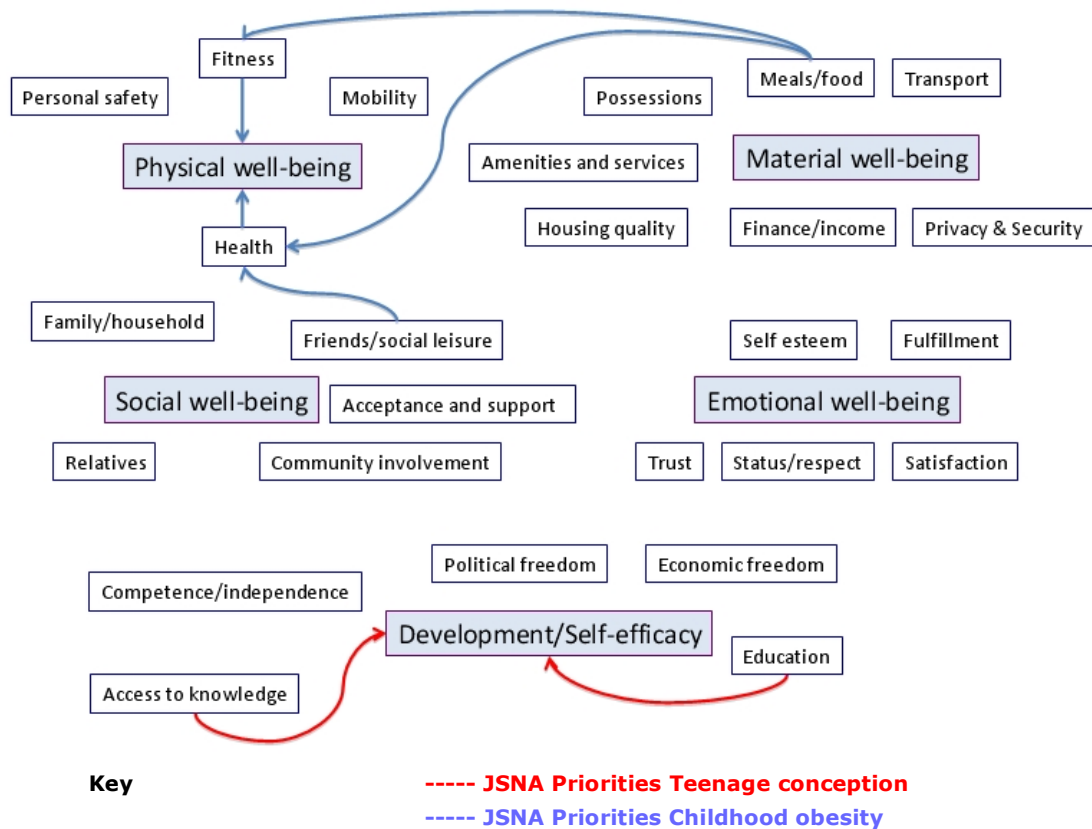
Figure 31: Mapping of JSNA Child and Adolescent Health criteria to well-being concepts

In terms of teenage conception the JSNA states that "Teenage conception rates are falling but 2010 targets will not be met if current trends continue," (JSNA, p. 10). That is to say, the rates are falling but not quickly enough. The JSNA report proposes that targeted sexual health services for young people are the most effective way of reducing teenage conception rates. As such, dominant message is an educational one, if levels of teenage sex education can be increased, then levels of teenage conception should decline. In this context, teenage conception tends to be framed as a personal development issue that can be addressed through increased access to knowledge and education. It is teenage conception rates that will be considered in more detail in terms of child and adolescent health needs.

Figure 31 demonstrates the dominant ways in which child and adolescent public health issues are framed within the JSNA. For example, in terms of childhood obesity, it tends to be seen as primarily related to issues of physical wellbeing, comprised of levels of general fitness and health and the link between these levels of fitness and the types of foods being eaten by the target population and the levels of active participation in leisure activities. For teenage conception it is primarily an educational issue. However, and this is not to criticise the JSNA, there are additional factors that also contribute. Webb and Ryan (2009) question the advantages of target and priority setting, arguing that target setting, for example, can favour certain groups and practices over others. If teenage conception is taken as an example, a programme of targeted sexual health services is deemed to be the most appropriate response. This approach may well work for areas such as Packwood, but when considered in terms of areas such as Kingshurst, Chelmsley Wood and Smiths Wood, then there are other factors which interfere, most notably the levels of IMD scores in relation to Education, Skills and Training. Compare Figure 32 below (taken from the JSNA) showing how for some areas of Solihull the overall teenage conception rate is above that for England.
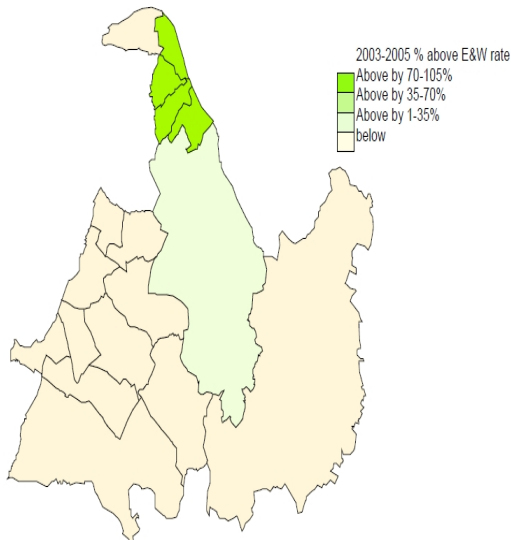
Figure 32: SCT Teenage conception rates above England average rate (Source: JSNA, p. 42).
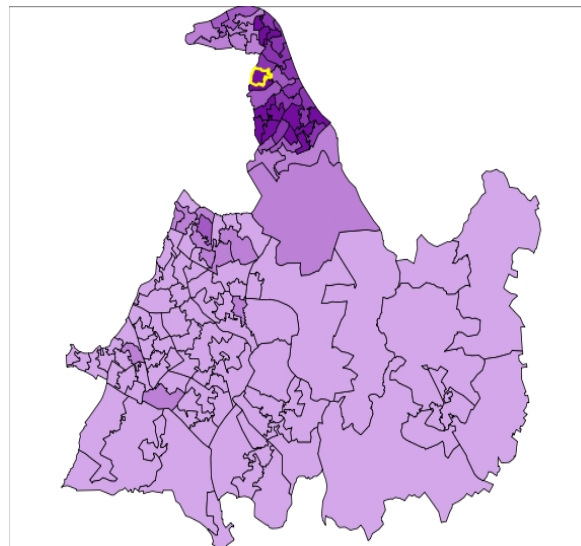
**Figure 33: Education Skills and Training IMD rank scores Solihull LSOA 2007 (source: ONS)**

The green areas in Figure 32 indicate those areas where the teenage conception rate is between 70 and 105% higher than the England average for rates of teenage conception. It is clear that it corresponds highly with those areas in Figure 33 where there were the highest levels of deprivation in terms of Education, Skills and Training, indicating that areas of high teenage conception rates are areas of low educational, skills and training attainment. This does not however mean that education and access to information however delivered will address the whole problem. The relationship between factors of deprivation and health status are complex and multifaceted. Whilst educational attainment may be a factor in rates of teenage conception, they are not the only, nor we would argue, the primary factor. Consideration must be given to other factors such as social class, ethnicity, family structure, family function and a range of other psychosocial factors. For example, Valle et al. (2005) from a survey of 11395 Norwegian school children aged 14-17, found a clear indication that social class has a clear influence on age of sexual debut. They found "social class variations for girls, particularly increased risk for early debut, among working class girls," (p.190). Ethnicity was also found to influence the age of sexual debut amongst girls, where "minority youth of Asian origin, including Pakistani girls, were less likely to have had early debut than ethnic majority girls," (p.191).

In addition there are strong links between family structure and levels of deprivation. Where families are single parent households, for example, levels of deprivation tend to be higher. However, Sweeting and West (1995) argue that the relationship between family structure and health is hard to unpack. They go on to argue that "aspects of family functioning, particularly a poorer relationship and conflict with parent(s), were independently associated with lower self-esteem, poorer psychological well-being and (among females) more physical symptoms at both ages," (p. 163). So, in this context, it is not the structure of the family that has most influence, but the nature of the relationships within that family that have most influence. To return to Valle et al. (2005) they found that where a family function was primarily a monitoring[38] one then this had a mediating effect on age of sexual debut, the higher the level of monitoring, then the higher the age of sexual debut. They also found an effect between social self concept (measured around self report measures of social self-perception) and age of sexual debut, and academic self concept (measured around self report measures of education self-perception) and age of sexual debut. A positive academic self perception was found to be protective for males and females. Valle et al. conclude that psychosocial factors, such as academic self perception and social self perception, seem to have more influence on boys than

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[38] Where monitoring was regarded as the level of openness between children and their parents in terms of how honest they were with parents in regard to who they were spending their free time with

girls influencing their age of sexual debut.
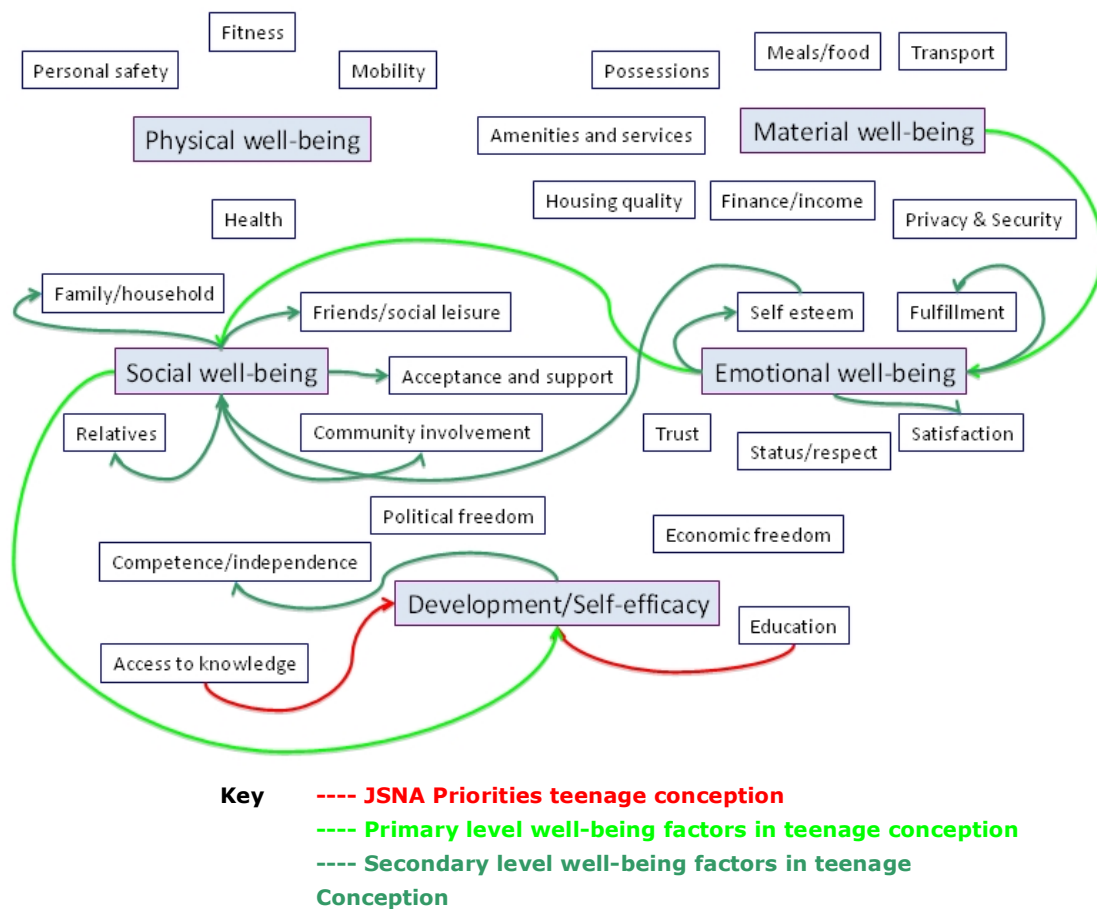
Figure 34: Mapping of JSNA criteria on teen conceptions to well-being concepts incorporating all levels of well-being

The reverse holds true for girls, where social class, ethnicity, family structure and family functions all appear to have more influence than psychosocial factors. Corroborating Valle, Smith and Elander (2005) identify how 'life expectation' is a key factor in rates of sexual debate, and that this differs on a social class basis. These issues, as identified in the research literature, can be regarded as primary factors in the rates of teenage conception across this population group. The primary level factors of social class and ethnicity might best be regarded as issues associated with material well-being. Issues of social self-perception and academic self-perception could be seen to cluster around emotional well-being (also a primary level factor). The role of family and relations (also primary level) can be seen in terms of social well-being and life expectation might be best understood in terms of issues of development/self efficacy. However, these primary levels also involve secondary level factors, around issues of development, self esteem and such like. Whereas public health campaigns may tend to focus only on targeted education or sexual health programmes, a more fruitful approach might be to incorporate a number of these levels of wellbeing (at primary and secondary levels) into the digitisation of services for child and adolescent service users within SCT.

This report has neither the scope nor the remit to systematically address the interplay and interconnection between these social and psychosocial factors. The point of Figure 34 is to contextualise the research findings in order to demonstrate the complexity and to highlight the potential that an appropriate 'digitalisation' of SCT's service delivery & citizen engagement strategy might have in terms of tackling some of the much more deep rooted and systemic influences in rates of teenage conception. It is suggested that service users themselves (i.e. the client group) would be best placed to inform SCT about some of the complexity of these interconnected health factors with a view to ensuring the digitisation process moved out of the narrow confines of knowledge and education into the wider socio-geographic contexts in which this population group lives.

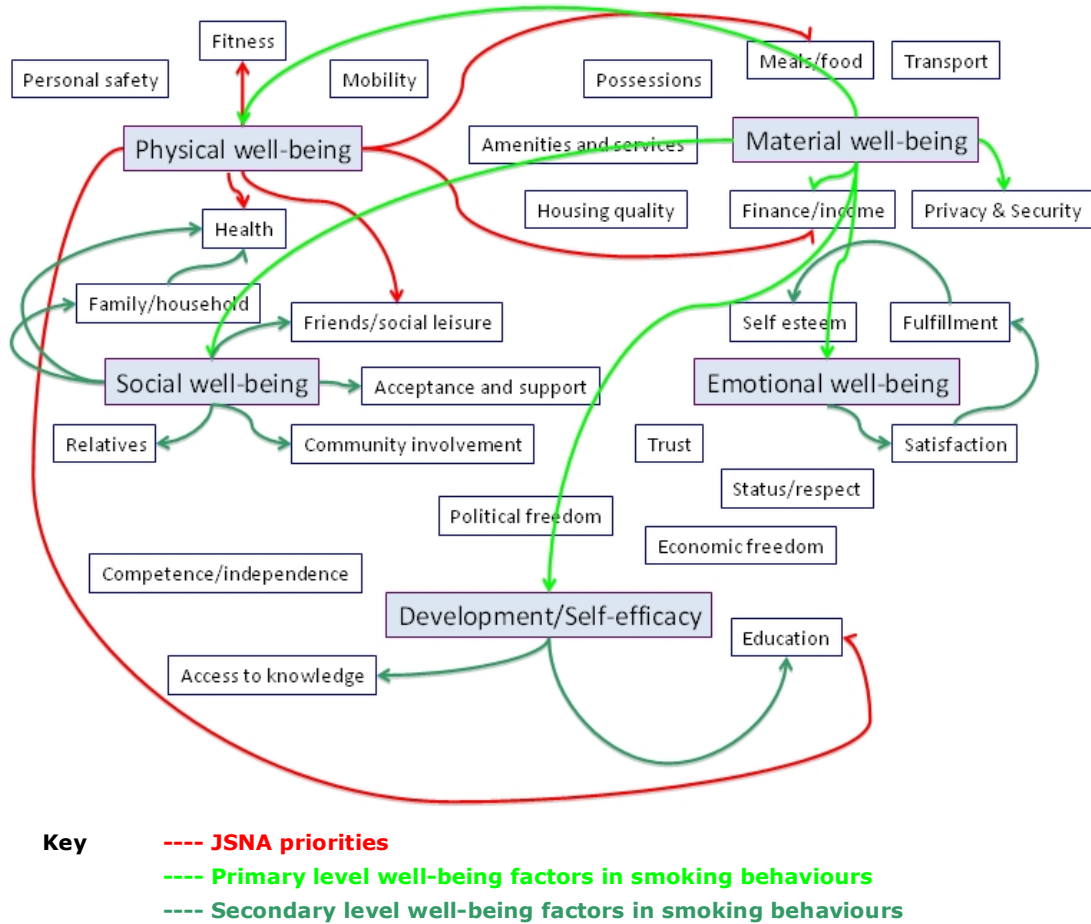# 5.2 Adults of Working Age Health Priorities in JSNA

For working age adults the priorities revolve around cardiovascular diseases and stroke, smoking prevention/cessation, preventing obesity, alcohol abuse and future diabetes through lifestyle management services, in particular targeting those areas of high needs or which are deprived to reduce inequality especially in the north of the area. . If these criteria are mapped onto the well-being concepts then this is represented in Figure 35.

Key   ----- JSNA priorities
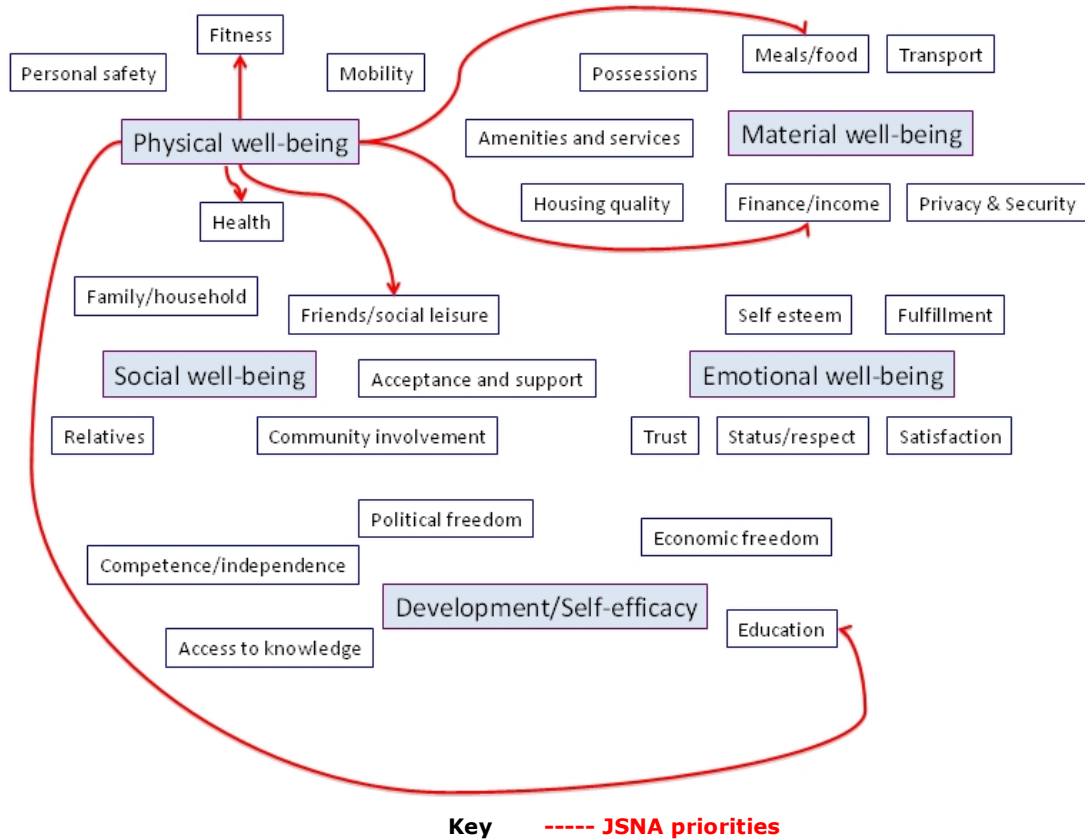
Figure 35: Mapping of JSNA Adults of Working Age Priorities to well-being concepts

The most immediate feature of this representation is the concentration of adult health priorities around notions of physical wellbeing. The focus on lifestyle management and education on health behaviours operates at the level of individual working adults in SCT. However, and in common with the previous example on teenage conception, it is difficult to separate these individual health behaviours (conceptualised as physical well-being) out from the wider structural factors (such as employment status, levels of community cohesion, social support) and psychosocial factors (such as levels of self-esteem, independence and self-efficacy). These factors echo the arguments made in relation to teenage conception. An additional issue to consider here is the process of targeting. Bevan (2006) criticises the target culture in the provision of healthcare on three grounds. Firstly he refutes the idea that a scoring system can prioritise what matters. He details the huge diversity that can occur in terms of "local variations in the performance of the providers of secondary care" and in terms of "local variations in the socio-economic composition of the populations of PCTs" (p.72). Secondly, he points to an argument that target systems create a context where "failures of performance not reflected in the scoring system do not matter," (p.73). Those areas identified as priority areas were "… identified as priorities because they were directed at important failings of the NHS: inequalities in health persist despite a NHS free at the point of consumption; the UK has poor outcomes compared with other countries for cancers and heart disease (Leatherman and Sutherland 2003; Bevan 2006). A key criteria in targeting (as discussed by Bevan and also Rawlinson (2008)) is that targets become those aspects of healthcare that are measureable. This measurability is evident in the JSNA priorities of the respective population groups.

However, the argument that this report makes, and the potential that lies in an effective digitisation process is to cut across these targeted priorities. To develop new and innovative ways in which smoking cessation for example, might be linked into a broader understanding of the interaction between employment status, housing conditions, life expectations and self-esteem. Figure 36 outlines an alternative model of smoking cessation.

Key   ---- **JSNA priorities**
     ---- **Primary level well-being factors in smoking behaviours**
   ---- **Secondary level well-being factors in smoking behaviours**

Figure 36: Mapping of JSNA criteria on adults of working age to well-being concepts incorporating all levels of well-being

Where the model differs is in terms of identifying possible primary and secondary level criteria adjudged to be more relevant to levels of accumulated advantage and disadvantage and in trying to get beyond a narrow and individualistic modus of health and lifestyle management. There is a strong class gradient in health inequalities (Wilkinson 1986). This is reflected in the health behaviours identified in the JSNA priorities for adults of working age but a process of targeted lifestyle management does not sufficiently address that social class gradient. Blane et al (1993) argue that "The ability of middle class parents to ensure middle class occupations for their children, and the frequency with which childhood deprivation is follow by a life of manual labour, illustrate the ways in which social advantage or disadvantage can accumulate during the life course," (p.12). They conclude that the "concept of social class involves the interconnectedness of social advantages and disadvantages, and the study of these would seem a useful way of investigating the causes of social class differences in health". In terms of Figure 36, this focus on accumulated disadvantage in relation to negative health behaviours would mean considering the interconnectedness of material wellbeing (a primary indicator of social class status) with the other secondary level wellbeing factors (indicated by darker green lines). In the diagram primacy is given to levels of material well-being as the key determinant of smoking behaviour (it is also, however, directly linked to all other levels of well-being). It is not possible for SCT to tackle levels of material disadvantage, such as levels of income or job security. The task then becomes to try and disaggregate those other well-being factors (across the other four well-being domains) that might be incorporated into a public health smoking

cessation campaign, issues such as participants gaining support from families, improving levels of self-esteem and engagement in activities that can improve feelings of social and emotional well-being. The setting up of community level support for smokers trying to stop may facilitate short term gains in terms of enabling the person to stop, but could also contribute to increased levels of community cohesion and fostering levels of social capital within disadvantaged communities. The inequalities identified in terms of the JSNA are primarily inequalities caused not by different lifestyles, but by the interconnectedness of social advantage and disadvantage and by the accumulation of these factors. These are not inequalities that appear from nowhere amongst this targeted group, rather they are the accumulation of factors associated to levels of social well-being, emotional well-being, development/self efficacy and material and physical well-being over the life course. If the significance of indices of multiple deprivations within these communities is properly understood, it is not enough to target individual health behaviours. Those behaviours need to be addressed at the level of the community or wider area. It is possible that the digitisation of services within SCT would be much more effective were it able to encapsulate this. One way in which this might happen is if people from these areas, across SCT, are actively involved in the drafting and implementation of the digitisation of services (Bjerknes, Ehn et al. 1987; Cullen 2004; Neff and Stark 2004; Adria, Anderson et al. 2008), such that they are given scope to input what they think the most salient factors are in terms of the five levels of well-being in relation to specific public health criteria. The suggestion being put forward here is not that public health targets are dropped, but that the criteria used to inform processes of addressing these targets be broadened out to encompass the interconnected co-morbidity of factors of deprivation across levels of well-being and that services must be co-produced with their users.

5.3 The Elderly Population Priorities in JSNA

The focus of SCT's services with a particular emphasis on conditions such as heart disease, stroke, diabetes, arthritis, falls/fractures, mental health problems (particularly dementia) and also support for carers (where Solihull is perceived to be lagging behind. What happens when these priorities are added to the levels of well-being map is represented in Figure 37
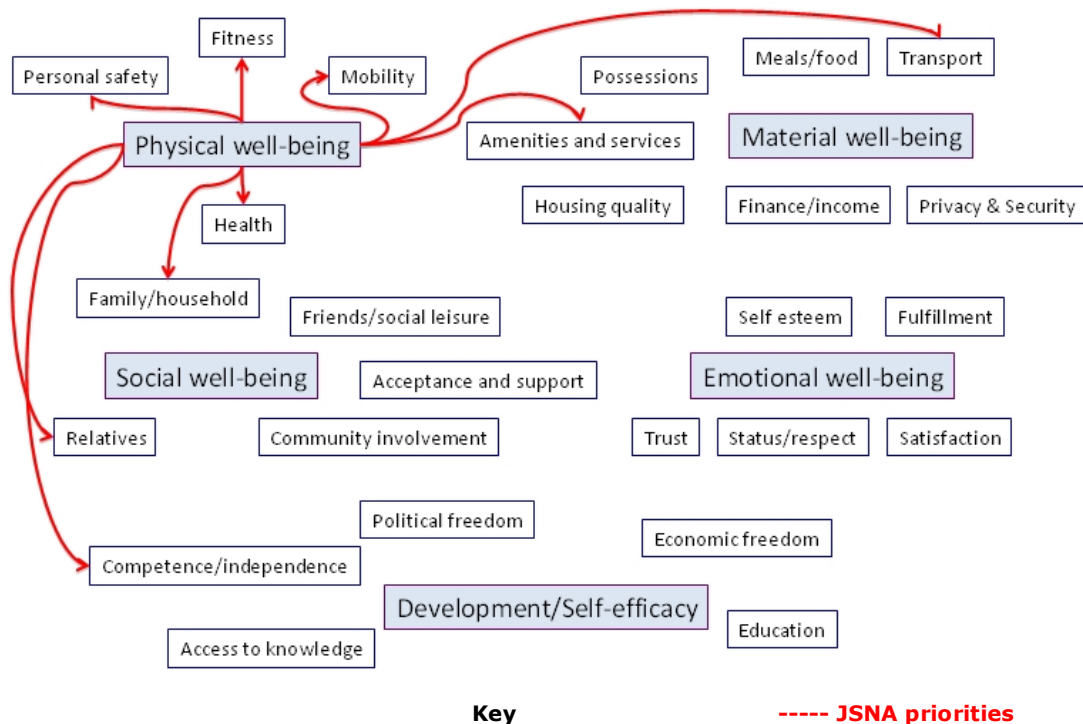
Figure 37: Mapping of JSNA criteria for Elderly populations to well-being concepts

The figure demonstrates the primary focus retained around level of physical wellbeing. However of the three priorities discussed in this section, it is the elderly population which has a broader base in terms of the other levels of well-being. This may be because other primary

groups are involved in supporting this population (i.e. family members as carers). Also, issues of capacity (both physical and mental) are invoked in terms of issues of personal safety, mobility, amenities and services and issues of competence/independence. As such, the elderly population may be a group best suited to a more holistic approach to their care, but paradoxically in the context of processes of digitisation, they are the group currently most likely to have lower levels of ICT uptake (especially mobile telephones and PC based internet).

Section 3.2.6 has already established that issues around increased levels of social capital and social support can have a significant effect on general levels of health and well-being amongst elderly populations. In effect this would mean identifying and exploring links between levels of social well-being and emotional well-being.

Key   ---- **JSNA priorities**
       ---- **Primary level well-being factors in elderly population**
       ---- **Secondary level well-being factors in elderly population**
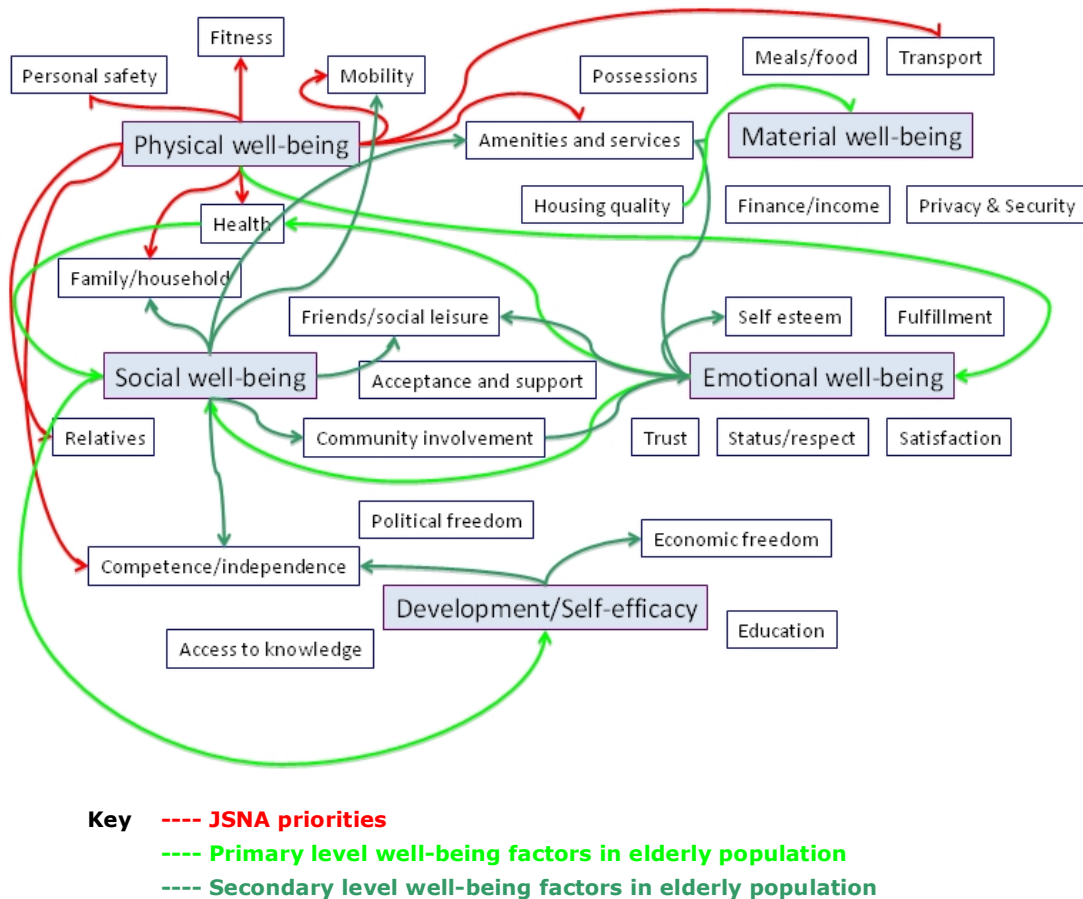
Figure 38: Mapping of JSNA criteria on elderly populations to well-being concepts incorporating all levels of well-being

The model proposed here is intended to bring the healthcare of the elderly out of the narrow confines of physical wellbeing and to enable processes where the emotional, social and material well-being of this group can be addressed. Walker (1981) argues that poverty (and consequently levels of health are well-being) are direct functions of firstly, low economic and social status prior to retirement and secondly, what he refers to as 'the depressed social status of the retired," (p.73). If the social and emotional well-being of this population group is addressed, in terms of community wide activities aimed at creating and facilitating social exchange across different sections of the population. One example might be a time bank attached to a general practitioners surgery (see Rushey Green time bank http://rgtb.org.uk/). Time banks involve people trading hours for assistance with various activities. In the case of the elderly this might involve people making befriending visits to accumulate time credits. These time credits can then be cashed in to get someone to fix their lawnmower. Seyfang (2004) argues that time banks "greatest potential is as a radical tool for collective social capital building, resulting in more effective social, economic and political citizenship, and hence social inclusion," (p.71). The point is that activities such as this function to bring elderly people into more contact with other people, addressing possible isolation but simultaneously building social

capital across the community, thus perhaps addressing some of the issues raised by Walker.

With the push towards direct payments and individualised budgets, the role of elderly people in their care faces a number of unique opportunities. Successful digitisation in this context would address issues of social and emotional wellbeing as well as issues of physical and mental health. Again, as with the other population groups a suitable starting point may be to talk to the population groups themselves about this more holistic approach to their health care, in terms of the interconnected layers of well-being put forward in this section.

6 PRELIMINARY SUGGESTIONS FOR A DIGITAL INCLUSION APPROACH

It should be clear from the preceding discussions that we do not advocate a singular 'Digital Inclusion Strategy' but instead recommend that specific social care and/or health related interventions that could be digitally mediated need to be considered holistically (Section 4.3) whilst taking advantage of the way in which a range of digital technologies may be able to support 'coping' through peer networks (Section 4.2) and behavioural change through self-management (Section 4.1.).

We therefore recommend an approach that, for any proposed intervention, has two elements:

1. ***Digital Leverage***: The consideration of the value of digital technologies in mediating the primary and secondary social/health well-being processes of interest. In any given case this is likely to be based on existing literature, case studies or where these do not exist extrapolations from evidence-based models or scenarios.

2. ***Digital Proofing[39]***: The consideration of the extent to which known patterns of access to and skills in the use of digital technologies may prevent equitable outcomes from a digitally mediated intervention or service.

We would argue that both of these activities should be carried out collaboratively by interdisciplinary groups comprising service providers, user/patient groups, social scientists and technological innovators. These elements are, of course, additional to the normal consideration of socially equitable interventions which must attempt to ameliorate the structural inequalities in health outcomes that would otherwise ensue.

To make these more concrete we illustrate their value in considering three different potential interventions that follow from the preceding discussions of Solihull's main social and care needs/drivers and evidence 'to date' on what works.

In each case a consideration of Digital Leverage would help identify a range of innovative ways in which different social groups might best be engaged in the programme. Thus the use of SMS or mobile-based services might engage younger people whilst PC or Digital TV based might suit others and the services themselves may also need to be suitably differentiated so that the more peer-oriented interactive approaches might support some groups but a more directed practitioner based or self-guided evaluation approach may work for others.

The process of Digital Proofing will help to identify areas where specific demographic or place-based investments might be needed to enable equitable outcomes – such as training or 'user support' centres (Lindsay, Smith et al. 2007; IPSOS/MORI/Ufi 2008). This may be particularly relevant if, for example part of the service is an online interaction space (c.f. Woodruff et al. (2007)) that requires reasonable broadband connectivity or initial 'user training' for those with poorer digital skills or lower confidence. It may also be relevant where the target population is predominantly composed of those less likely to be 'digitally engaged' or who live in rural areas less likely to be served by current and future fixed (e.g. ADSL/cable-based broadband or FTTH) and mobile (GSM/wifi/3G/wimax network infrastructures (Stern, Adams et al. 2009).

In each case we recommend a more focused in-depth study to lay out the existing literature and evidence base as well as to identify suitable partners for both the Digital Leveraging (innovation/generative) and Digital Proofing processes. The former should build explicitly on the TSB's ALIP projects (ref. Section 4) and on the evidence being compiled through the NHS'

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[39] Here we draw explicitly on the Commission for Rural Communities' concept of rural proofing.

Whole System Demonstrator programme[40] as well as on ongoing technological research and development in academia and elsewhere.

6.1 Smoking Cessation

The JSNA is clear that smoking cessation is a priority across nearly all demographic groups in Solihull and there seems to be growing evidence that digitally mediated interventions and self-help groups can help to support counselling, clinics and similar traditional services. We therefore suggest that SCT may wish to develop a suite of services to support smoking cessation that are based on the holistic approach described above and which also provide peer-group and self-management support services (Brendryen, Drozd et al. 2008) as well as online facilitated counselling (Woodruff, Conway et al. 2007). In doing so they may well engage a range of citizens in contributing to overall current and future well-being in Solihull.

6.2 Teenage Lifestyles

The second suggestion is to focus on teenage lifestyles with a particular focus on sexual health, teenage conception and diet/exercise (Stinson, Wilson et al. 2009). As above we suggest a holistic approach (Fletcher, Harden et al. 2007) which includes lifestyle management functions (Skinner, Biscope et al. 2003) with (potentially anonymous) peer-group discussion/support functions. Given recent research that suggests an increased willingness to use e-Health technologies by young people who have multiple risk factors (Tercyak, Abraham et al. 2009) digital leveraging might enable engagement with traditionally hard to reach and difficult to engage groups. Further, there is growing evidence that fun-based activities can have stronger positive effects than problem or behaviour focused messages (DeBar, Dickerson et al. 2009) and it is also becoming clear that engaging young people in the production of their own content provides a powerful engagement tool and a sustainable strategy (Neff and Stark 2004). This resonates strongly with the suggestion, informed by the holistic approach, that attention should also be given to digitally leveraged intensive youth projects which can "provide structured life-skills and vocational education, volunteering and social support for young people who are at "high risk" of teenage pregnancy and other problem behaviours [since these] have been shown to be effective in modifying young people's behaviour, promoting safer sex and reducing teenage pregnancies." (Fletcher, Harden et al. 2007). It is quite possible that the co-creation of their own content and services by young people in partnership with a range of local service providers and stakeholders will not only engage them in healthy lifestyles *but also* provide structured life and vocational skills *and* social support.

6.3 Coronary Heart Disease

Our final example draws explicitly on the 'Hearts of Salford' project (Lindsay, Smith et al. 2007) and draws together several aspects of wellbeing and so is well suited to the holistic approach. It is known that CHD diagnosis is linked to middle/older age and to multiple deprivation. In addition by its nature it can lead to increased social isolation as the patient withdraws from the labour force and (may) become less mobile. There is some evidence that intensive monitoring of Chronic Heart Failure patients can reduce the risk of death and/or hospitalisation (Scherr, Kastner et al. 2009) whilst Lindsay et al's work suggests that for multiply deprived CHD patients peer-support groups can have a have a significant effect on diet and self-efficacy and levels of social support. Given the JSNA's suggestion that the "gap in premature mortality from CHD and Cancer between the most affluent and most deprived populations is widening and is predicted to widen further" (p10) there must therefore be a strong case for developing digitally mediated services for and in partnership with this group.

6.4 Digital Inclusion and Total Place

Finally we want to offer a further demonstration of the utility of this whole systems approach by broadening the discussion out to consider the Total Place concept. The Coventry, Solihull

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[40] http://kingsfundlibrary.co.uk/wsdan/

and Warwickshire Total Place pilot study is intended to improve health outcomes for children and young people by reshaping and developing services that help meet their needs. It involves partnership between Coventry City Council, Solihull Metropolitan Borough Council and Warwickshire County Council (collectively referred to as CSW) and identifies five goals, three of which are relevant to the whole systems approach advocated in the current report. The pilot project aims to 'enable all young people to benefit from the opportunities available to them for education, training, or employment and to enable young people to make informed and supported choices about their future," (p. 7). In addition, the document also states that a goal of the project is to 'improve the health of the child population and reduce inequalities in health across the CSW area,' (p. 8). Lastly, the project also aims to 'synergise and rationalise the use of resources in improvement services, and broker a new commissioning relationship for these services, overseen by the respective Children's Trust in each of the local authorities,' (p.8).

Taking these total place priorities and applying them to a teenage conception context (for example) it becomes possible to sketch out how issues of digital inclusion might fit into this total place context. Figures 32 and 33 show the overlap between areas of high teenage conception rates and areas of high deprivation in terms of education, skills and training. A total place strategy that aimed to incorporate the holistic approach advocated in this report would involve identifying those social and health care providers, across the CSW area, who could contribute to service provision in terms of the physical, social, material, emotional, and developmental wellbeing of this population group. It is suggested that this would involve public health practitioners, children's services practitioners, educational providers, social care providers **and young people**, all working in partnership on a wider campaign aimed at tackling high rates of disadvantage in terms of education, skills and training. This type of activity offers a holistic approach to addressing teenage conception rates, whilst also addressing and reducing levels of inequality in these area, increasing levels of education, vocational skills and employment and enabling young people to make informed decisions about their future. Following on from our discussion above we would argue that the specific health behaviour (decline in teenage conception rates) should not be presented as the primary reason for the existence of the programme, rather this should be seen as a secondary effect that would flow from the primary activities we have described.

The multi-agency scope of Total Place presents a real opportunity for this type of initiative to be developed and deployed across the CSW area. Where digital inclusion might fit into this total place programme would be in terms of a multi-platform suite of technologies (incorporating the digital leverage and digital proofing of the previous section) that can support the co-construction of interactive services co-ordinated across both young people in the area and the range of providers involved. Co-ordination of a teenage conception project which was primarily constructed around issues of increased wellbeing through reduced levels of deprivation (by building levels of vocational skills and social capital for example) would fit very neatly into the overall pilot.

7 SUMMARY AND NEXT STEPS

In this report we have introduced an approach to 'Digital Inclusion' which deliberately steers away from the contemporary view of digital inclusion as a problem in and of itself which can be addressed simply through investments in cheaper or more usable technologies. Instead we recommend an orientation towards the consideration of the ways in which the range of social processes that underpin social inclusion can be intentionally digitally mediated to ensure better health related life outcomes.

In the context of Solihull Care Trust this means a consideration of key health needs, together with core socio-demographics and probable distributions of current (and future) technology access can provide a basis from which to consider the appropriate digital mediation of specific social (and health) processes for specific groups of people. It is this mapping process which to us must constitute SCT's Digital Inclusion Strategy and it must be based on the detailed consideration of the layers of wellbeing for each priority group set out in the previous section, the innovation that flows from *Digital Leverage* and the 'audit check' that flows from *Digital Proofing*.

We have presented three worked examples that match to three of Solihull Care Trust's

expressed priorities and which could be taken forward through collaborative research and development.

We consider the best next step to be a generative workshop session with key stakeholders from SCT, the University of Essex (both technologists and social scientists) and the wider 'e-Health' community using the report as input. This session would provide a high level synthesis of the results and arguments put forward in this report and then seek to generate proposals for digitally mediated services which can meet the expressed needs in a holistic manner.

These proposals may build on the three examples above or may reflect new or additional SCT priorities or programmes. In doing so the workshop may make use of the innovative, theoretically grounded 'interrogation structure' described in Greenhalgh and Stones (Forthcoming) and reproduced in Annex C. This process intended to produce a range of elaborated, clustered and prioritised proposals for future research, development and (potentially) deployment activities.

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Annex A   ALIP PHASE I (USER CENTRED DESIGN AND HOME BASED SYSTEMS)

Material sourced from: http://www.alip-healthtechktn.com/al-directory.html

An evaluation of the potential benefits of proactive preventative telecare and telehealth systems.

> The installation of personal Telecare systems that allow remote collection, analysis and evaluation of activity and vitality data. The development of a software knowledge database that will allow the early identification of well-being issues through activity monitoring and interpretation. Using existing equipment (e.g. movement sensors, blood pressure monitors, etc) we will transmit data to an expert system that will highlight early intervention opportunities, thus reducing care home and hospital admissions and allowing early hospital discharge whilst increasing patient and carer confidence.

Gait Trainer

> This project will develop an innovative gait training system for people with an abnormal gait. The target application includes the elderly, disabled or people recovering from an injury, who have an unsteady gait. The system will comprise sensor modules with embedded software worn on the legs. Data will be analysed to calculate stride duration and knee flexure angle and this will be used for diagnosis.

Health hub; user centred design, development and integration with the built environment.

> The project provides a framework to advance UK Assisted Living provision to the stage where barriers of scale have been removed, user centred design, legacy planning and future building needs identified in readiness for full scale demonstrators in 2012. The project brings together key players needed to integrate assisted living technologies into the built environment.

i-Deal - (Intelligent Design Engine for Assisted Living Technology (i-DEAL))

> This proposal focuses on the evaluation of electronic assistive technologies to support industry partners in the design and development of "fit for purpose" products. This novel approach aims to map technology requirements against end user needs and develop user performance specifications for each product or concept put through the evaluation cycle.

MATCH (Mobilising Advanced Technologies for Care at Home)

> This project is researching and evaluating a range of technologies in support of social and health care delivery to the home. Specifically, the project has developed novel technologies in areas such as a service platform for home care, policy-based management of care, dynamic reconfiguration of home services, analysis of user activity in the home, speech synthesis and recognition for older users, and multimodal interfaces to the home care system.

NOCTURNAL (Night Optimised Care Technology for UseRs Needing Assisted Lifestyles)

> NOCTURNAL addresses the needs of people at the early stages of dementia to provide therapeutic support and guidance during the hours of darkness. The primary objective of the work is to provide new technological capabilities that support more sophisticated service offerings to be marketed by Fold Telecare.

PEACE - Personal Care Environments delivering support for vulnerable people.

> Building on a significant, operational telehealth/telecare deployment, PEACE progressively incorporates functions proven in other domains to provide integrated health & social care, allowing health and social care professionals & lay carers to work in harmony to maximise patients' quality of care/life.

TV-based video telephony platform for assisted living and telehealth.

> This project will provide affordable in-home two-way video technology for telehealth, including supply of health information, and tele-consultation with health professionals. The technology will be re-purposed from a television set-top-box videophone system. The requirements and initial market deployments of this technology will be driven by a

complementary telehealth initiative led by the Airedale Hospital Trust. Technical innovations will be applied to the base product to adapt it to the telehealth application, including an improved User Interface, cameras with zoom and pan controls, improved authentication and security, and integration with a streaming video server for information prescriptions.

VirtEx

Virtex is a partnership between Tunstall, Fold Housing Association, Housing 21, DigiTV and the University of Sheffield which will deliver an innovative research project to develop a Virtual Extra Care Service (VIRTEx) within local communities. The aim of the VIRTEx project is to build a virtual community of connected carers and cared-for, to deliver flexible community-based care, preserve social inclusion and maintain a healthier lifestyle and independent living by encouraging change in behaviour.

Annex B   ALIP Phase II (A Smart Care Distributed Environment)

No information currently public.

Annex C   QUESTIONS TO GUIDE A STUDY OF AN UNFOLDING TECHNOLOGY PROJECT OR PROGRAMME FROM THE PERSPECTIVE OF STRONG STRUCTURATION THEORY

MACRO LEVEL QUESTIONS IN RELATION TO AN UNFOLDING PROGRAMME

Mapping the network-in-focus

1. What is the prevailing political, economic, technological and institutional context within which the technology is being introduced locally or nationally?
2. What is the socio-technical network of this project or programme? Which agents and technologies are represented, and what are their position-practices?
3. What are the key relationships (agent-agent, technology-technology, agent-technology) in the network and how are they changing over time?
4. To what extent has stability of the network been achieved – and why?

MICRO LEVEL QUESTIONS FOCUSED ON SPECIFIC CONJUNCTURES WITHIN THE UNFOLDING PROCESS

Mapping the relevant part of the network in focus

1. Who are the key agent(s) involved in this conjuncture?
2. What is [are] the key technology[ies] involved in this conjuncture?
3. What technological, financial and organisational infrastructure is needed to support it?

Analysis of actant's internal structures

What internal structures are relevant to the conjunctural situation?

1. Agent's general dispositions (e.g. socio-cultural schemas, hierarchies of values, virtues, cognitive capacity, embodied skills, past experience)

2. The material properties and inscribed socio-cultural structures of relevant technology

3. Agent's conjuncturally-specific knowledge (perhaps imperfect): of relevant external structures (the strategic terrain) – including socio-cultural knowledge of how other agents view the world (of technology-in-focus's material properties and inscribed socio-cultural structures; and of technology-in-focus's range of functionality relevant to the immediate

Actant's active agency

1. What does the agent do – i.e. how does s/he reflexively relate to, and draw on, general dispositions, conjuncturally-specific knowledge, and technological properties (actant's internal structures) in an unfolding sequence of action?
2. How do the social structures (e.g. norms, duties, physical and cognitive demands, rights, rewards/sanctions) inscribed, deliberately or inadvertently, in the technology-in-focus enable, influence, or constrain the active agency and strategic orientations of agents?

Outcomes

1. What are the immediate consequences of specific actions (intended and unintended)?

2. How do these consequences feed back on the position-practices in the network and wider external structures?

3. What significance – both positive and negative - do these consequences have for others in the network in terms of power, legitimacy, and other factors?

4. What role has the technology-in-focus played in the production of these positive and negative consequences?

Policy/Political Implications

1. How modifiable are the inscribed technological features of 2c **(in Figure 2)** that have contributed to negative consequences? By whom are they modifiable, and over what timescale?

2. Addressing 1 ('how modifiable'?) needs to be linked to lessons learned from analysis of prior negotiations (fights, even) about standards, codes, fields, access privileges, interoperability, and other 'technical' questions? E.g. who were the players, who won, and why?

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