North West Mental Wellbeing Survey

Profiles of wellbeing

NorthWest Public Health Observatory

liverpool JMU Centre for Public Health

A report commissioned by:

NHS North West

1. Introduction

1.1 Segmentation and Clustering

"Segmentation is a process of looking at the audience or 'market' and seeking to identify distinct sub-groups (segments) that may have similar needs, attitudes or behaviours".[1]

Segmentation is a tool that is being used increasingly in public service delivery in order to target and develop services that are in tune with the needs of the population. The approach has been championed by the National Social Marketing Centre and is included as one of its benchmark criteria for delivering behavioural interventions as a means to avoid 'blanket approaches'.[2]

Traditionally there has been a focus on using demographic and geodemographic characteristics to understand the differences in local population need. Existing segmentation tools that are provided commercially have been used to try to understand specific health related behaviours such as alcohol consumption.[3] However, in recent years it has been realised that this alone is insufficient to understand what 'moves and motivates people'. This has led to the rise in the use of more psychographic data to further understand the softer differences between people and the different services and support they require to make healthier choices.[i] Work has also been undertaken to look at people's health behaviours more holistically through the Department of Health's Healthy Foundations segmentation.[4]

1.2 Regional Survey of Mental Wellbeing

The North West Mental Wellbeing Survey 2009 (NWMWS)[5] is one of the few large scale surveys that includes psychographic data on how people feel about themselves alongside data related to health behaviours such as smoking, physical activity, alcohol consumption and cannabis use. In addition, questions relating to social capital, demographics and employment provide a rich background against which to better understand people living in the North West. For this reason NHS North West has commissioned an exploratory cluster analysis of the survey data to develop a segmentation model.

"The aim of any segmentation should be to define a small number of groups so that:

- all members of a particular group are as similar to each other as possible, and
- they are as different from the other groups as possible".[1]

This report sets out the segmentation resulting from a clustering process applied to the NWMWS. The segmentation provides some insight into the lives and wellbeing of groups in the population. When considered in relation to a complementary piece of work, *North West Mental Wellbeing Survey: What influences wellbeing?,*[6] a picture begins to emerge of what may be driving levels of wellbeing among different segments within the population. Understanding these differences will support the development of tailored approaches to improving wellbeing across the North West.

[i] Psychographic factors used in segmentation include activities, interests, opinions, attitudes and values.

2. Report structure

This report has been structured to focus on the findings of the clustering and the final segmentation rather than technical detail. A brief description of the data and methods is provided here, with further technical detail on the method used available separately.[7] The key differentiating factors of the segments have been shown in a segment map. A series of pen portraits based on statistical profiles of each segment have been developed. These build up a more detailed picture of the lives of the people classified within them.

Finally, there is a short discussion and conclusions are drawn as to how the segmentation may be used.

3. Data and methods

The data used in this report was taken from the NWMWS 2009,[5] a survey of 18,500 persons in the north west of England. The survey comprised 44 questions covering a range of indicators, including the seven-item Warwick and Edinburgh Mental Wellbeing Scale (WEMWBS) and questions relating to factors which may influence it. The WEMWBS produces a score ranging from seven, at the lowest level, to 35 at the highest level of wellbeing. The NWMWS produced a mean score of 27.7. From this initial dataset, a deprivation score was attached to each respondent based upon their place of residence at the time of the survey using the Index of Multiple Deprivation 2007[ii]. The WEMWBS scores were recoded to allocate each individual to one of three levels of mental wellbeing: above average, average or below average.[iii] This allowed each respondent to be described by the deprivation of their residential area and their level of wellbeing.

An advanced clustering technique was then used to segment the data into natural partitions. The method used was designed to be used with categorical data, such as that found in attitudinal and behavioural surveys.[iv] The process was repeated 1,000 times for each of the potential number of partitions that the data could fall into, and each partition set was evaluated to determine which was the most appropriate. Once the optimum number of clusters had been determined the best performing solution was selected. The process was run twice, first using the entire dataset, and a second time using a data visualisation to select the variables to be included in creating the clusters. The initial analysis produced five clusters. Around two-thirds of the survey respondents can be allocated to one of these. A further third of respondents do not display sufficiently distinct behaviours to be truly allocated to one segment and hence are allocated to a segment of 'best fit'. For the purposes of simplicity and to prevent dilution of the distinguishing characteristics of the principal segments, this third of respondents have been considered separately as linked segments.

4. The segments

A map of the clusters is shown in Figure 1. The circles show the five principal segments, the size of the circles reflects their relative size and the numbers of respondents from the survey

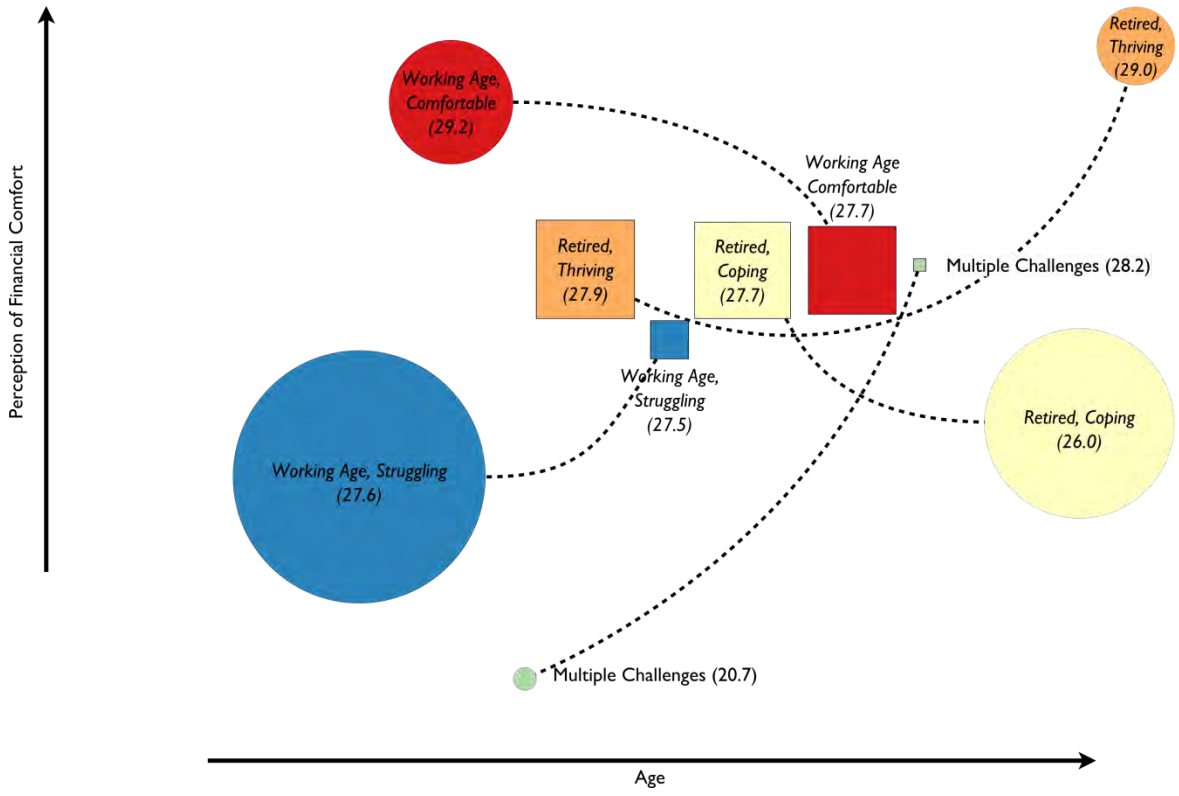
[ii] The Index of Multiple Deprivation 2007 combines a number of indicators, chosen to cover a range of economic, social and housing issues, into a single deprivation score for each small area in England. This allows responses to be categorised and subsequently analysed according to their level of deprivation.
[iii] Above and below average wellbeing were defined as one standard deviation above or below the mean.
[iv] The method used was a K modes algorithm developed independently at Liverpool John Moores University. For more details see Jarman et al. (2011).[11]

that fall within each segment are shown in Table 1. The squares show the linked segments; that is, a group of respondents who do not have the same characteristics as the main segment, but the link shows the segment they 'best fit'. The linked segments have been included to show the transitory nature of respondents and how individuals may move between segments if particular characteristics that determine which segment they fall into change.

The segments have been plotted to show their relative positions regarding age (based on mean age scores) and their perceived financial comfort. The survey did not collect information on respondents' income levels; however it did ask people to describe their feelings about their household income. Responses ranged from living comfortably, to coping, finding it difficult or finding it very difficult on present income. The mean score to this and the age question have been used to determine the position of each segment on the map. These factors were chosen as they, along with self reported health, appeared to be the main variables that differentiated between segments and this was verified with correspondence analysis.[8,9]

The numbers in brackets indicate the mean wellbeing score of the group. Box 1 outlines the five clusters and a summary is provided in Figure 2.

Figure 1: Map of clusters by age and perception of financial comfort.



Source: North West Public Health Observatory from the North West Mental Wellbeing Survey 2009. (Numbers in brackets denote wellbeing scores of each segment.)

Box 1: Brief description of cluster types.

Working Age, Struggling represents the youngest of the groups. It has lower levels of perceived financial comfort and lower wellbeing.

Working Age, Comfortable is a little older than the struggling group and sees its financial situation more positively. It has higher levels of wellbeing.

Multiple Challenges has the lowest wellbeing of all the groups, perceives its financial situation as being very difficult. Its average age is generally skewed on average towards the younger end.

Retired, Thriving is the oldest group. It has the highest levels of perceived financial comfort and the highest levels of wellbeing.

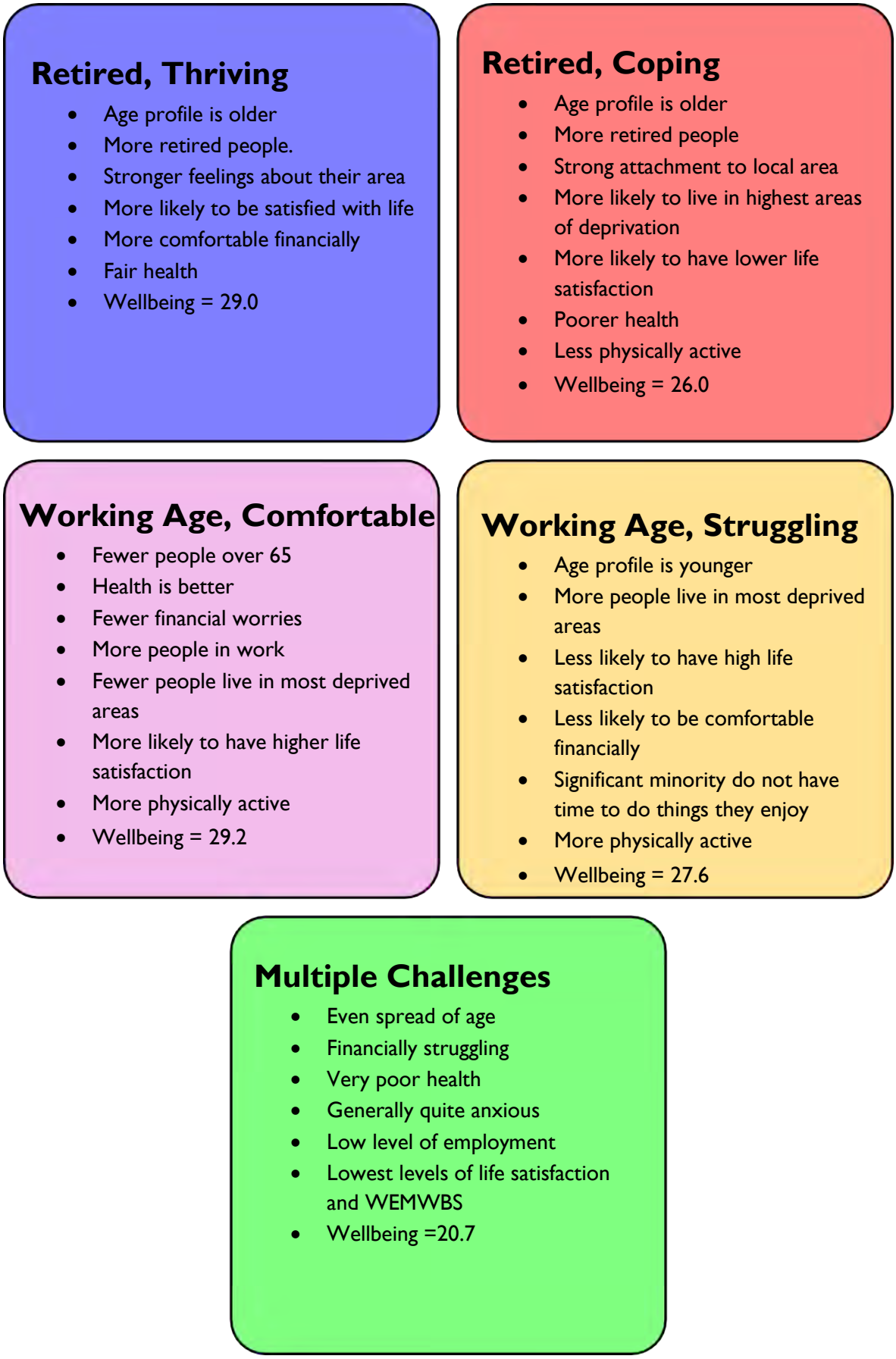
Retired, Coping is an older group, but perceives its financial situation as poor and has one of the lowest wellbeing scores.

Table 1: Relative size of clusters.

	Main segment		Linked segment	
Segment name	**Sample size**	**% of sample**	**Sample size**	**% of sample**
Multiple Challenges	217	1.2%	240	1.3%
Retired, Coping	3,595	19.4%	1,780	9.6%
Working Age, Comfortable	2,361	12.7%	1,635	8.8%
Retired, Thriving	1,486	8.0%	1,827	9.8%
Working Age, Struggling	4,694	25.3%	725	3.9%
Total	**12,353**	**66.6%**	**6,207**	**33.4%**

Source: North West Public Health Observatory from the North West Mental Wellbeing Survey 2009.

Figure 2: Primary features of clusters.



Note: The average wellbeing score across the North West region was 27.7.

5. Segment descriptions

A pen portrait of each of the segments is provided below which describes the key characteristics of each and also the distinguishing features of the linked segments. As with all segmentation and cluster models it cannot be assumed that because an individual falls into a particular segment they will have all the segment's characteristics, rather based on their responses to a survey an individual may be more likely to fall into one segment than another.

5.1 Working Age, Struggling

This segment is made up of 25.3% of the sample and is the largest group. It tends to be dominated by younger people (aged under 40 years). People are coping on their current income, but with a significant minority finding it difficult to manage. It is common for people in this group to have frequent money worries although most people feel they have someone to turn to if they need financial support. Although employment levels are high in this group given the skew to younger ages, there are also significant numbers who are unemployed. The areas people live in tend to fall into the two most deprived quintiles of deprivation. There is some attachment to the local area and some satisfaction with it. Health tends to be good and levels of anxiety and depression low. Cannabis use tends to be a little more common amongst this group than some of the others. Most people in this group tend to not drink alcohol or they drink at sensible levels. A small minority drink at hazardous or harmful levels. There are a significant proportion of smokers in this group. Lifestyles tend to be quite active, with the majority being active for more than four hours a day. This group are more likely to feel they have time to do the things they enjoy but a significant minority do not feel this way. Life satisfaction tends to be medium to high, but a below average number have high life satisfaction. Levels of satisfaction with relationships also tend to be high and the majority of people have contact with people outside their household on a weekly basis. There is a spread in levels of wellbeing, but they tend to be close to average.

Linked segment: There is a much smaller group of people in the linked segment than in the main group. This group has a higher proportion of retired and older (65+ years) people and hence differs in its employment status. These older people are not so worried about money. They have poorer health than the main group and feel strongly about their area. They are slightly less likely to have contact with people outside their household on a weekly basis.

5.2 Working Age, Comfortable

This segment is made up of 12.7% of the sample. People in this group tend to be middle aged (40 to 64 years) and to be living comfortably or coping on their current income. Levels of household employment are high and unemployment is low. People in this group feel confident they could borrow money from somebody if they needed to. Only a minority of people in this group feel they have frequent money worries. Most people in this group are more likely to live in areas that fall into the least deprived quintiles of deprivation. They have a strong sense of attachment to their local area and a high level of satisfaction with it. The majority feel they have time to do the things they enjoy. Life satisfaction tends to be high. Levels of good health are very high and anxiety and depression amongst this group are low. They have high levels of satisfaction with their personal relationships and regular contact with people outside their household. Most people in this group drink at sensible levels or not

at all. Most have never used cannabis. Smoking levels are lower in this group, with only a quarter smoking. The majority having never smoked or have given up. Levels of sedentary activity are lower in this group, the majority being sedentary for less than four hours a day. Over half the group have high levels of wellbeing.

Linked segment: Less people fall into the linked segment than the main group. However fewer people class themselves as having good health compared to the main group. There are more people over 65 years, so economic status tends to be different with more retired people. Fewer people are comfortable financially, most are coping. They are generally less physically active than the main group. There are fewer people with high life satisfaction and more people with lower wellbeing than the main group. They feel strongly about their area, but not so much as the main group. Satisfaction with relationships is high but slightly lower than the main group. They have slightly less contact with people outside their household compared to the main group.

5.3 Multiple Challenges

This segment represents by far the smallest proportion of respondents (1.2%). However they are living with the most challenging conditions. It tends to be made up of a broad range of age groups falling mainly within the 25 to 54 years of age range. Most are living in areas that fall within the two most deprived areas of deprivation with 68% in the most deprived. More than three-quarters of this group are unemployed or are not working due to sickness or disability. The majority of this group are finding it difficult or very difficult to get by on their present income and most worry about money all the time or quite often. Very few feel they have somebody they can rely on for financial support and 40% are dissatisfied with their personal relationships. People do not have a strong attachment to their local area and are dissatisfied with it. The vast majority feel they do not have enough time to do the things they enjoy. Less than a sixth would describe their health as good, whilst two-fifths describe it as bad. Over 90% have moderate or higher levels of anxiety or depression. The overwhelming majority have below average mental wellbeing, with only a very small proportion of people in this group having an above average level of mental wellbeing. A significant minority, compared with other clusters, drink at hazardous or harmful levels. Smoking levels in this group are high, with around four-fifths currently smoking. A significant minority have used cannabis in the past, or indeed very recently. Sedentary lifestyles are also common among this group and 28% have contact with people outside their household less than weekly.

Linked segment: This group is larger than the main segment but still only represents 1.3% of the sample. It has a far higher level of wellbeing. It is made up of mainly older, retired people who are more comfortable financially than the main group. They have stronger feelings about their area and are more satisfied with it. They have better health and wellbeing, consume less alcohol and are less likely to be unemployed if of working age. They are less likely to live in the more deprived areas. Life satisfaction tends to be higher.

5.4 Retired, Thriving

This is made up of 8% of the sample. People in this group are mostly above the age of 65 years (81%) and are retired (92%). People in this group tend to be the most comfortably off of all the groups with only a minority just coping on current income. They feel that they can ask people for financial support if needed. They have only occasional worries or even no

worries about money. They have an attachment to their current area and satisfaction levels with it are high. People feel they have time to do the things they enjoy. Few have ever used cannabis. Health tends to be good and anxiety and depression levels are low. Levels of wellbeing are skewed towards higher levels. Life satisfaction tends to be high. People here tend to be non drinkers or sensible drinkers. Smoking levels in this group are low, although many have smoked in the past and given up. This is a relatively active group with over half being sedentary for less than four hours a day. There is a high level of satisfaction with personal relationships particularly compared with other older segments. Although contact with people outside their household on a weekly basis is high, it is lower than some of the younger groups, with 10.6% having contact less than weekly.

Linked segment: Slightly more people fall into this liked segment than the main segment (1.8% more people than the main segment.) More people live within the highest deprivation quintile than the main group, they are less comfortable financially and less people have the highest levels of life satisfaction compared with the main group. As this segment tends to be younger than the main group a greater proportion of people are in employment, and a smaller proportion are retired.

5.5 Retired, Coping

This is the second largest segment with 19.4% of the sample falling into it. This group tends to be made up of people aged over 65 years. Economic activity tends to be low with the greater proportion of people being retired and a small proportion sick or disabled. The greater proportion of people in this group tend to be living in areas that fall into the two most deprived quintiles of deprivation and the most deprived quintile in particular. People in this group are coping, rather than comfortable, on their present income. A small proportion of them have frequent money worries. The majority have a strong sense of attachment to their local area and are satisfied with it. Most people feel they have time to do the things they enjoy. A significant minority have poor health and have high levels of anxiety and depression. Levels of satisfaction with relationships are very high (84.6% are satisfied) but lower than for the *Retired, Thriving* group (94.6% are satisfied). They also have less weekly contact with people outside of their household, with around 13% not having contact with someone at least on a weekly basis. Most of the people in this group feel they have somebody they can turn to if they need financial support. The majority drink alcohol at sensible levels or not at all. Around a quarter of this segment smokes and a fifth are ex-smokers. They are less physically active than the *Retired, Thriving* group. Over half have below average mental wellbeing. Only 18% tend to be satisfied with life.

Linked segment: More people fall into the main segment than into this linked segment. There are fewer people over 65 years, fewer retired and more working people. They have much better perceived health and higher wellbeing than the main group. They are coping better with their income and worry less about money as a consequence. Fewer people are living within the most deprived quintile. They have better overall life satisfaction. This group is more satisfied with personal relationships and has more weekly contact with people outside their household than the main group.

6. Discussion

The cluster analysis has revealed that there are clear differences between groups of people who have high and low levels of wellbeing. There are clear differences between the segments in terms of age, their perceived financial situation, health, wellbeing and the level of deprivation in which they live.

The clusters show that lower levels of mental wellbeing are associated with poorer general health and perceptions of a poor financial situation. Those groups who are struggling with their financial situation also tend to live in the areas of greatest disadvantage. However, this alone may not be driving poor wellbeing, for example the *Working Age, Struggling* and *Multiple Challenges* groups largely live in areas of disadvantage yet have different wellbeing scores. Differences between these two groups include unemployment, sickness and disability, satisfaction with personal relationships and also having people to turn to for financial support. Although both groups have high proportions of people with money worries, far less people in the *Multiple Challenges* group feel they have someone to turn to if they are in financial need. They are also less satisfied with their personal relationships. Both of these can be protective factors against low levels of mental wellbeing.

Health behaviours differ significantly between the groups with those having the lowest levels of wellbeing also having higher smoking levels and drinking at harmful levels. Those groups with higher wellbeing tend to have more people who demonstrate an ability to change their health behaviour, such as giving up smoking. Table 3 shows that the *Retired, Thriving* group has proportionately twice as many people who have given up smoking as the *Retired, Coping* group, which has a similar age profile.

Table 2: Changes in smoking behaviour between groups.

Cluster	Percentage of ex-smokers within each cluster
Multiple Challenges	9.68
Retired, Coping	20.89
Working Age, Comfortable	18.55
Retired, Thriving	47.11

Source: North West Public Health Observatory from the North West Mental Wellbeing Survey 2009.

Retired, Coping and *Retired, Thriving* both have older age profiles, yet the health of those in *Retired, Coping* is far worse than those in *Retired, Thriving* as are levels of wellbeing. There are subjective differences in their financial situations with *Retired, Coping* just managing financially rather than living comfortably as *Retired, Thriving* appears to be.

7. Conclusion

It has been possible to segment the NWMWS 2009 data of 18,500 individuals into five discrete population clusters, or groups, based on wellbeing. This helps us to understand populations by wellbeing and the complex interrelation of associated factors. At a local level it can be built on and used to inform local planning, the development of services and local environments that promote wellbeing. It can be used to inform tailored approaches to improving wellbeing across the North West and could, for example, allow for tailored

application of the *five ways to wellbeing*[v,10] public messages and how these are incorporated into public service provision.

There are differences between the groups not just in terms of mental wellbeing, but also in many of the factors that may contribute to positive mental health such as age and perceived financial comfort, as well as relationships and social contact. There are also differences in health behaviours such as smoking, alcohol consumption and physical activity and differences in abilities to change health behaviour, for example giving up smoking. All of these factors may have an association with mental wellbeing and this is particularly so within the *Multiple, Challenges* group where wellbeing is lowest.

The clusters have been presented on an axis using perceived income and age. These two variables, along with health, are key differentiators between the groups. The plot indicates that higher levels of mental wellbeing appear to be associated with higher perceptions of financial comfort across age groups.

The segments give some indication of groups whose mental wellbeing may need to take priority. The profiles show the complexity of people's lives and how a range of factors interact to determine levels of mental wellbeing. The importance of the perceived adequacy of income and financial security is indicated by the differences in wellbeing scores between the segments. Wellbeing is also associated with other health behaviours such as smoking, alcohol consumption and physical activity and policies to affect these behaviours need to take account of broader wellbeing factors. The value of this work is in the strength of association that it shows between wellbeing and health behaviours. It suggests how important it will be to address wellbeing in order to improve health behaviour and reduce health inequality. The segments have shown there is a clear association with wellbeing and health behaviours and that wellbeing underpins positive health behaviour change.

The cluster analysis has provided a means of seeing differences in the population to support more tailored approaches to improving or maintaining mental wellbeing as well as addressing health behaviour change. The sub segments tend to differ from the main group by life stage and factors associated with this such as economic status or health. These differences may highlight important factors that if changed could improve wellbeing. For example, there is a sub segment of younger people in the *Retired, Coping* group who are still in work and so are less worried about money. However, on retirement or if they become unemployed, this sub segment could move into the main segment which is characterised by lower mental wellbeing and general health.

The clusters provide a starting point for understanding differences between groups of people by looking at people's lives in a more holistic way. The importance of how several factors together can impact on wellbeing is more apparent. This report highlights groups of factors that may be indicative of a high risk of poor wellbeing and may assist in targeting interventions. For example being an older person does not necessarily equate to poor wellbeing, but this together with financial worries, poor health, low social contact and dissatisfaction with personal relationships may increase the risk. Older and more deprived

[v] The 'five ways to wellbeing' are: *connect* with the people around you; *be active*, go for a walk or run, cycle or play a game; *take notice*, be aware of the world around you; *keep learning*, try something new; *give*, do something nice for a friend or stranger.

groups tend to have lower satisfaction with relationships and less contact with people. Changes in factors that influence wellbeing suggest the transitory nature of people between groups and stress the importance of early identification of people who may be at risk of lower wellbeing. For example, the loss of social networks and income that accompanies unemployment may result in movement from the *Working Age, Comfortable* group to the *Working Age, Struggling* group. Likewise gaining better paid employment may have the opposite effect.

There are limitations to the clusters. In devising strategies at a local level it would be advisable to understand more about the particular environments that people are living within, as well as current social and economic issues that may be impacting on factors that underpin positive wellbeing, by drawing on local level intelligence. Identification of clusters at a local level would also be useful, whether in the general population or amongst service users. The clustering analysis could be applied to other surveys and administrative datasets in the future if further work were undertaken to identify the key questions that determine cluster allocation. These questions could then be included in local level data collection activities and used to identify the distribution of local populations between segments. They could be used for service reach analysis by identifying those segments service users fall into and hence identify where people may not be receiving the services they need. They could also be used to recruit people, who fit segment profiles, in local areas for qualitative research to enable a deeper understanding of the local context of people's lives, how local environments and events are influencing wellbeing and what can be done locally to ensure wellbeing is maintained and improved. Building on the clusters at a local level, to develop a deeper understanding of life context in planning local service and area development, would support the type of customer focussed methods that underpin a social marketing approach to health behaviour change.

8. References

[1] Association of Public Health Observatories (2009). Technical Briefing 5 Geodemographic Segmentation [Online]. Available at: *www.apho.org.uk/resource/item.aspx?RID=67914* [Accessed 11-3-2011].

[2] National Social Marketing Centre (2007). Big Pocket Guide to Social Marketing [Online]. Available at: *http://thensmc.com/resources/publications/Publications/orderby,2/page,2* [Accessed 11-3-2011].

[3] Carlin H, Morleo M, Cook P and Tocque K (2008). *Using geodemographics to segment the market for hazardous and harmful drinkers in Cheshire and Merseyside*. Liverpool: North West Public Health Observatory, Centre for Public Health, Liverpool John Moores University.

[4] MacGregor E (2010). Healthy Foundations Life-Stage Segmentation Model Toolkit [Online]. Available at: *www.ukpha.org.uk/media/2960/B14.2%20E.Macgregor.%20Healthy%20Foundations%20Life-stage%20Segmentati.pdf* [Accessed 11-3-2011].

[5] Deacon L, Carlin H, Spalding J, Giles S, Stansfield J, Hughes S, Perkins C, and Bellis MA (2010). *North West Mental Wellbeing Survey 2009.* Liverpool: North West Public Health Observatory, Liverpool John Moores University.

[6] Carlin H, Jarman I, Chambers S, Lisboa P, Knuckey S, Perkins C and Bellis MA (2011). *North West Mental Wellbeing Survey: What influences wellbeing?* Liverpool: North West Public Health Observatory, Liverpool John Moores University.

[7] Huang Z (1997). A Fast Clustering Algorithm to Cluster Very Large Categorical Data Sets in Data Mining. *Research Issues on Data Mining and Knowledge Discovery*, 1-8.

[8] Statsoft (2011). Correspondence Analysis [Online]. Available at: *www.statsoft.com/textbook/correspondence-analysis/?button=1* [Accessed 24-3-2011].

[9] Greenacre M (2007). *Correspondence Analysis in Practice*. London: Chapman and Hall.

[10] Aked J, Marks N, Cordon C and Thompson S (2008). *Five Ways to Well-being: A report presented to the Foresight Project on communicating the evidence base for improving people's wellbeing*. London: New Economics Foundation.

[11]Jarman IH, Etchells TAE, Lisboa PJG, Beynon CM and Martin-Guerrero JD (2011). *Clustering Categorical Data: A Stability Analysis Framework.* Accepted for IEEE Symposium Series on Computational Intelligence (SSCI), 11th – 15th April 2011. France: Paris.

Acknowledgements

The authors would like to thank all those who have assisted with the production of this report, in particular Jude Stansfield, Senior Public Health Advisor for Mental Health and Wellbeing at the Department for Health for advice and direction; Lynn Deacon, Ian Jarman, Jennifer Mason, Alyson Jones and Craig Timpson of the North West Public Health Observatory; Karen Hughes and Helen Lowey of Liverpool John Moores University, for input into the report, including contributions towards analysis and proofreading and Lee Tisdall of the Centre for Public Health, Liverpool John Moores University for design.

Helen Carlin, Ian Jarman, Simon Chambers, Paulo Lisboa, Steve Knuckey, Clare Perkins and Mark A. Bellis

North West Public Health Observatory

Centre for Public Health

Research Directorate

Faculty of Health and Applied Social Sciences

Henry Cotton Building

15-21 Webster Street

Liverpool

L3 2ET

t: +44(0)151 231 4535

f: +44(0)151 231 4552

e: nwpho-contact@ljmu.ac.uk

www.nwpho.org.uk

www.cph.org.uk

May 2011

ISBN: 978-1-908029-52-2 (PDF version)

NorthWest Public Health Observatory

liverpool JMU Centre for Public Health

A report commissioned by:

NHS North West