Abstract
With advances made in detailed cartography e.g. Google maps, we debated whether it would be ethical to highlight high risk areas of injecting drug use and needles being abandoned by individuals who are injecting drug users (IDUs). The detection of discarded needles in urban areas clearly demonstrated high risk areas in areas of high social deprivation despite there being nearby drug dependency units and needle exchange centres. Our team, have been previously published in high impact journals and we have already co-located these maps even after known street names and postcodes were omitted as it was felt that there may be a public backlash and outcry particularly from residents living in these areas. The maps were deemed to be targeted and a decision was made to submit the article without the maps despite this public sector data being available as a 'Freedom of Information' Act. This effectively diluted the 'geospatial' message of the article as it became more difficult to utilise the relative healthcare needs of this marginalised and often chaotic cohort and the availability of nearby, specialised healthcare services. Such maps provide a huge aid in public health commissioning and provision of healthcare services as guidance is given to high healthcare priorities and needs.

Introduction
Public injecting drug use continues to be an ongoing concern in most urban areas of western towns and cities leading to ongoing morbidity and mortality and the need to cater for community needs. Individuals who are injecting drug users (IDUs) to obtain a 'high' or inheritance often in risk taking behaviours including anti-social, criminal and sexual and further drug use. IDUs tend to congregate in groups with similar interests and activities are difficult to engage in general and specialised healthcare initiatives. The integration of sexual health service also delivers a regular outreach clinic from the DDU users about the risks they pose to themselves and others, and encouraging the use of needle exchange services if service users continue to inject. In addition, an incentive scheme is being introduced to encourage IDUs to return their used needles safely. The BBV centres have an integrated sexual health service so this is extremely useful in offering full sexual health screening for IDUs. The integrated sexual health service also delivers a regular outreach clinic from the DDU users about the risks they pose to themselves and others. The integrated needle exchange programmes have significantly reduced the incidence of BBV transmission in IDUs. However, provision does not seem to be sufficient or effective at reducing discarded needles and syringes. Clearly the task of locating, locating drug and career discarded needles in the selected areas of Milton Keynes is a huge and exhaustive task so there will be limitations around accuracy of numbers in terms of visual inspection of all areas.

Protection of public health and the reduction of discarded needles and syringes was assumed reasonable rather than due to medicinal purposes e.g. insulin syringes as most therapeutic syringes/needles will be distinguishable, labelled and tend not to be used in public. Accurate numbers of clean needles and syringes being distributed and used needles being returned are elicited levels as reasons for non-acquisition to ascertain how such services could be improved to encourage utilisation by IDUs. These were mainly near to the drug treatment service and pharmacy needle exchanges as shown by the heavily altered Google map (see below).

Methods
In response to concerns about the numbers of used needles being abandoned in Milton Keynes (MK), UK in conjunction with a high number of BBV diagnoses, the Community Safety Partnership and Public Health Drugs & Alcohol lead collaborated to pull together a multi-agency working group, initially with the aims of analysing data to understand the scale and spread of the problem along with identifying what each organisation could be doing to reduce and reducing the incidence of abandoned needles through the use of geospatial mapping and Through data mapping, the group was able to identify hotspot areas where the majority of used needles were being abandoned. It was deemed acceptable to produce diagrams showing numbers of abandoned needles found monthly or even a table showing needles found in each estate with a comparative Index Multiple Deprivation (IMD) score. The maps were produced by the health protection department at MK Council, the housing team and the Parks Trust. When each area of MK was further analysed, it was found that the public backlash and outcry over the maps was more prevalent than expected. Public backlash and stigma of home dwellers residing in named areas.

Results
The main findings of this study suggest that a high number of abandoned needles is taking place in urban areas of high social deprivation clustered around needle exchange points, suggesting that IDUs collect injecting equipment, use in the vicinity and then abandon the used needles. These areas also have the highest rates of HIV, Chlamydia and unplanned pregnancies suggesting a high possibility of health and social risk behaviours. The findings also suggest that cartographical and geospatial planning can be useful in terms of planning and targeting the delivery of healthcare interventions, particularly in an outreach setting to cater for this cohort. In response to these findings, needle exchange services are being reviewed to ensure that healthcare professionals are appropriately trained in delivering effective needle exchange and harm reduction advice. The Drug Dependency Unit (DDU) also has a renewed focus on delivering high quality harm reduction interventions with the aim of reducing the rates of injecting drug use, educating service users about the risks they pose to themselves and others, and encouraging the use of needle exchange services if service users continue to inject. In addition, an incentive scheme is being introduced to encourage IDUs to return their used needles safely. The BBV centres have an integrated sexual health service so this is extremely useful in offering full sexual health screening for IDUs. The integrated sexual health service also delivers a regular outreach clinic from the DDU whisky is an example of best practice. The introduction of needle exchange programmes, there is still ongoing sightings and reports of discarded, used needles being distributed and used needles being returned are elicited levels as reasons for non-acquisition to ascertain how such services could be improved to encourage utilisation by IDUs. These were mainly near to the drug treatment service and pharmacy needle exchanges as shown by the heavily altered Google map (see below).

Ethical debate
As seen, this revealed important data in the context of geospatial analysis of where the discarded needles were in relation to the Drug Dependency Unit (DDU), BBV centre and needle exchange services. There were concerns such maps to be made in the public domain will be not just awareness of risk behaviours in the highlighted areas but also ‘stigmatises’ places and access to healthcare providers which can potentially deal with such risk incinences and healthcare issues. The main concerns from our team were the backlash from the public residing in this area from confidentiality and stigma despite this information being available publically. Publications of such maps are not routinely available or published online in the fear of visitors and dwellers being subject to stigmatisation, trolling etc. Although the heavily doctored maps should not be looked at postcodes of IDUs registered with the DDU to see if this coincides with the clusters of needles disposal areas for further possible healthcare outreach interventions. The main cohorts which are often stigmatised are IDUs and syringes and discarded needles are also well documented.

Discussion
There may be a public backlash and outcry particularly from residents living in these areas. The maps were deemed to be targeted and a decision was made to submit the article without the maps despite this public sector data being available as a ‘Freedom of Information’ Act. This effectively diluted the ‘geospatial’ message of the article as it became more difficult to utilise the relative healthcare needs of this marginalised and often chaotic cohort and the availability of nearby, specialised healthcare services. Such maps provide a huge aid in public health commissioning and provision of healthcare services as guidance is given to high healthcare priorities and needs.

Conclusions
There are ongoing sightings and reports of discarded, used needles being distributed and used needles being returned are elicited levels as reasons for non-acquisition to ascertain how such services could be improved to encourage utilisation by IDUs. These were mainly near to the drug treatment service and pharmacy needle exchanges as shown by the heavily altered Google map. The integrated sexual health service also delivers a regular outreach clinic from the DDU whisky is an example of best practice. The introduction of needle exchange programmes, there is still ongoing sightings and reports of discarded, used needles being distributed and used needles being returned are elicited levels as reasons for non-acquisition to ascertain how such services could be improved to encourage utilisation by IDUs. These were mainly near to the drug treatment service and pharmacy needle exchanges as shown by the heavily altered Google map. The integrated sexual health service also delivers a regular outreach clinic from the DDU whisky is an example of best practice. The introduction of needle exchange programmes, there is still ongoing sightings and reports of discarded, used needles being distributed and used needles being returned are elicited levels as reasons for non-acquisition to ascertain how such services could be improved to encourage utilisation by IDUs. These were mainly near to the drug treatment service and pharmacy needle exchanges as shown by the heavily altered Google map. The integrated sexual health service also delivers a regular outreach clinic from the DDU whisky is an example of best practice. The introduction of needle exchange programmes, there is still ongoing sightings and reports of discarded, used needles being distributed and used needles being returned are elicited levels as reasons for non-acquisition to ascertain how such services could be improved to encourage utilisation by IDUs. These were mainly near to the drug treatment service and pharmacy needle exchanges as shown by the heavily altered Google map. The integrated sexual health service also delivers a regular outreach clinic from the DDU whisky is an example of best practice. The introduction of needle exchange programmes, there is still ongoing sightings and reports of discarded, used needles being distributed and used needles being returned are elicited levels as reasons for non-acquisition to ascertain how such services could be improved to encourage utilisation by IDUs. These were mainly near to the drug treatment service and pharmacy needle exchanges as shown by the heavily altered Google map. The integrated sexual health service also delivers a regular outreach clinic from the DDU whisky is an example of best practice. The introduction of needle exchange programmes, there is still ongoing sightings and reports of discarded, used needles being distributed and used needles being returned are elicited levels as reasons for non-acquisition to ascertain how such services could be improved to encourage utilisation by IDUs. These were mainly near to the drug treatment service and pharmacy needle exchanges as shown by the heavily altered Google map. The integrated sexual health service also delivers a regular outreach clinic from the DDU whisky is an example of best practice. The introduction of needle exchange programmes, there is still ongoing sightings and reports of discarded, used needles being distributed and used needles being returned are elicited levels as reasons for non-acquisition to ascertain how such services could be improved to encourage utilisation by IDUs. These were mainly near to the drug treatment service and pharmacy needle exchanges as shown by the heavily altered Google map. The integrated sexual health service also delivers a regular outreach clinic from the DDU whisky is an example of best practice. The introduction of needle exchange programmes, there is still ongoing sightings and reports of discarded, used needles being distributed and used needles being returned are elicited levels as reasons for non-acquisition to ascertain how such services could be improved to encourage utilisation by IDUs. These were mainly near to the drug treatment service and pharmacy needle exchanges as shown by the heavily altered Google map.

References

Ethics of publishing detailed street maps showing areas of risk behaviours to healthcare journals
The use of mapping data in the form of detailed Google street maps to identify hot spots for needles being abandoned brings a number of ethical issues. Public display of data may bring concerns about confidentiality, public backlash e.g. over house prices on residing in a high risk area and associated stigma as residents/victors to the areas highlighted may recognise landmarks even in heavily doctored maps. Guidance is needed in terms of submission of risk data in IDU as well as other ‘marginalised’ risk behaviour subjects e.g. alcohol use to journals for educating and guiding other healthcare professionals. Nevertheless, geospatial analysis and use of needle exchange programmes are being reviewed to ascertain how such services could be improved to encourage utilisation by IDUs. These were mainly near to the drug treatment service and pharmacy needle exchanges as shown by the heavily altered Google map.

Ethical dilemmas of submitting detailed street maps showing areas of risk behaviours to healthcare journals
1. Department of HIV, Milton Keynes University Hospital, UK
2. Faculty of Business and Law, Open University, UK
* Corresponding author Email dushyant.mital@mkuh.nhs.uk