Modelling demand on Nottinghamshire Police

Embargoed until 16:00 on Wednesday 17th July 2019
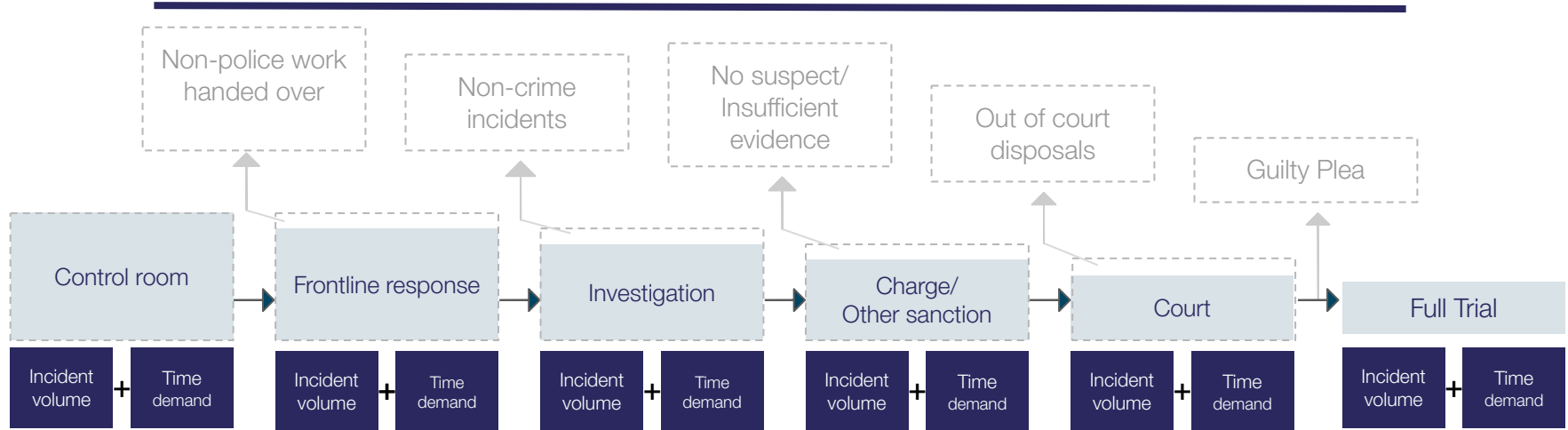
Contents

Headline findings

- Available police hours are already being outstripped by demand - and the gap is forecast to reach on average **29,000 officer hours/month by 2023**

- Assuming all else is equal, plugging that gap will require at least c. **260 additional officers by 2023 at an estimated cost of £19.2mn over 3 years** (analysis suggests there will be peak periods when up to 300 additional officers could be required)

- The predicted increase in demand is driven in part by increasing violent and sexual offences. **Violent and sexual offences combined have also increased** as a proportionate contribution of total demand from 40% in 2014 to 51% in 2018. Looking at the total *crime* only demand, violent and sexual offences made up 64% of *all crime demand* in 2018

- Although we cannot make specific recommendations around allocations of resource without further information, it is likely that the changing nature of demand will mean that the force will need to consider **investing in more detectives and more specialist skill sets** (e.g. digital investigation, forensics etc)

Methodology overview

Summary

- Our model works by **combining a number of statistical forecasting methods to analyse five years of historic data, and then project demand over the next four years.**
- There are several inputs to the model:
  1. Historical data detailing the volume of both incidents (control room) and offences (crime data)
  2. Control room data (to feed the model information on the proportion of incidents deployed to, the types of incidents which take longest to deal with, and the number of officers required on average to resolve each incident)
  3. Crime data (average proportions of each crime type reaching each stage of the investigation process e.g. screened in, out of court disposal, charged etc)
  4. Estimates of activity-based timings obtained from focus groups we conducted across the command structure and tested via a survey. By way of illustration, the model accounts for the fact that more serious offence types generally require a more detailed or lengthy investigation
- The model is focussed on 'reactive' or 'externally-driven' demand. Throughout the report where 'total demand' is referenced this refers to 'total reactive demand'
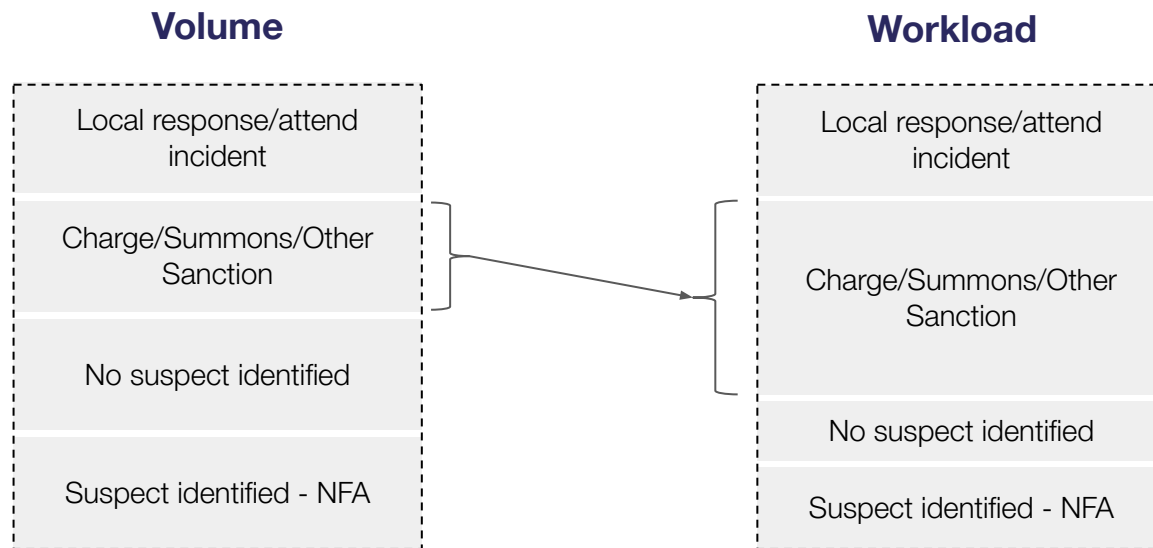- The following slides provide some more information on our methodology

The model accounts for the level of demand from the start of police involvement in an incident/offence to the very end. We looked at the proportionate outcomes for each offence type

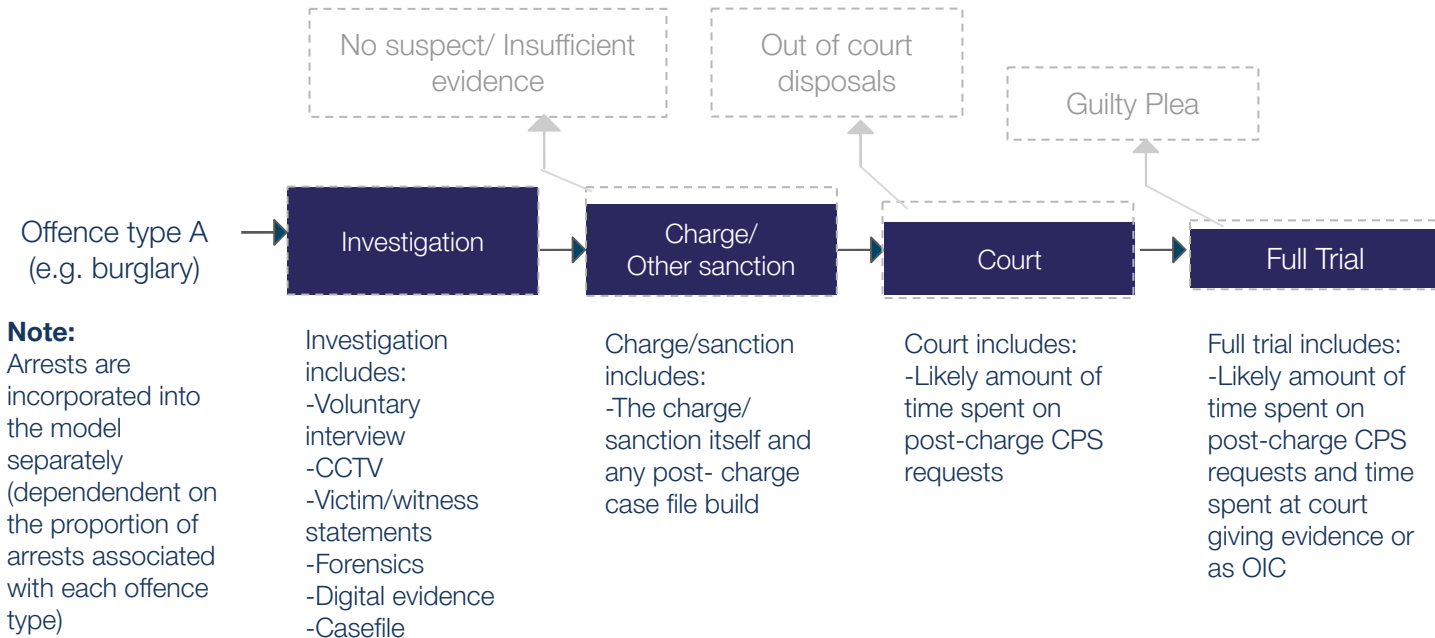The current model is centred around what we have termed 'reactive' demand (as opposed to 'proactive'). Essentially we are looking at **demand which stems from the control room or is otherwise reported/identified as a crime**.

We have not incorporated safeguarding and reassurance components of demand which are on the fringes of reactive and proactive. However we could include these in a future iteration of the model.

Activities are weighted to build up a *quantitative* picture of demand. For example we know that although the volume of cases with an identified suspect is smaller, the proportionate workload associated with these cases is higher

Volume

- Local response/attend incident
- Charge/Summons/Other Sanction
- No suspect identified
- Suspect identified - NFA

Workload

- Local response/attend incident
- Charge/Summons/Other Sanction
- No suspect identified
- Suspect identified - NFA

Focus groups conducted across the majority of the command structure helped us gain an understanding of the time demands associated with different parts of secondary investigations. Participants were asked how long they spent on:

No suspect/ Insufficient evidence

Out of court disposals

Guilty Plea

Offence type A (e.g. burglary) → Investigation → Charge/ Other sanction → Court → Full Trial

Note:
Arrests are incorporated into the model separately (dependendent on the proportion of arrests associated with each offence type)

Investigation includes:
-Voluntary interview
-CCTV
-Victim/witness statements
-Forensics
-Digital evidence
-Casefile

Charge/sanction includes:
-The charge/ sanction itself and any post- charge case file build

Court includes:
-Likely amount of time spent on post-charge CPS requests

Full trial includes:
-Likely amount of time spent on post-charge CPS requests and time spent at court giving evidence or as OIC

It is important to note that the model is structured by incident and offence type. Therefore each is assigned one 'average' time for the length of investigation. The model can account for different times to investigate a shoplifting versus an assault, but can not currently account fully for different times to investigate a complex assault vs a simple assault. We are developing the next version of the model to be able to do this more fully.

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The focus groups revealed that, while officers felt that 'high harm' offences have a greater investigative weight, many 'low harm' offences can also be burdensome because of other complexity factors

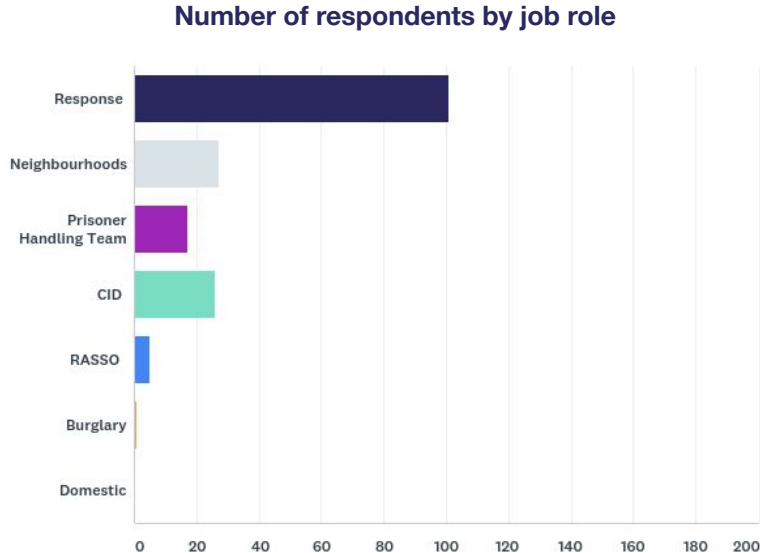During the focus groups officers raised a number of complexity factors, which are contributing to demand. **These were not within the scope of this piece of work, but there is potential to explore the impact of the following complexity factors further if there is appetite:**

- Age of victim/suspect
- Amount of digital and forensic evidence
- Numbers of victims/witnesses/suspects
- First language of victims/witnesses/suspects
- Number/distance of offence locations

For example 'Burglary A' might have just one named suspect and no available supporting evidence, whilst 'Burglary B' might have 12 witnesses speaking different languages, multiple mobile phones to download, forensic evidence to process and 5 hours of CCTV footage.

In the absence of more granular data, we have made sensible judgements about how this impacts the average length of investigations and then tested these with officers via a survey.

We then tested the findings from the focus groups with a larger group of officers through an online survey, and adapted the model inputs based on the responses

Number of respondents by job role

We provided respondents with the focus group findings for each component of investigation, and asked respondents to say whether the estimates were:
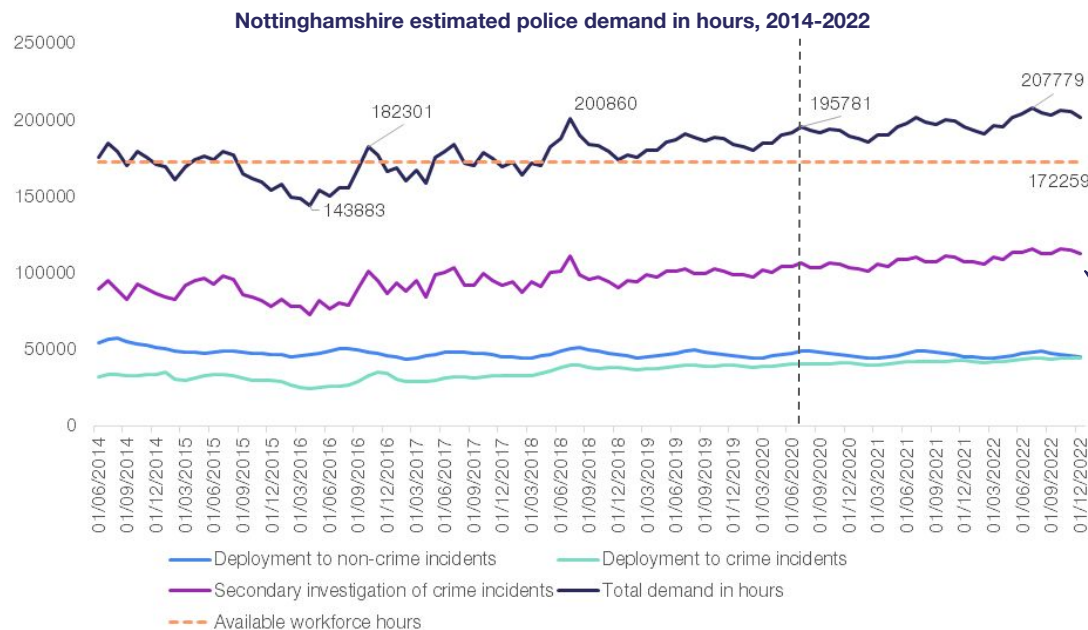
- Very low
- A little low
- About right
- A little high
- Very high

For each question asked in the survey we took the answer given by the *majority* to feed into the model, and then applied a uniform rule to converting responses into numerical inputs.
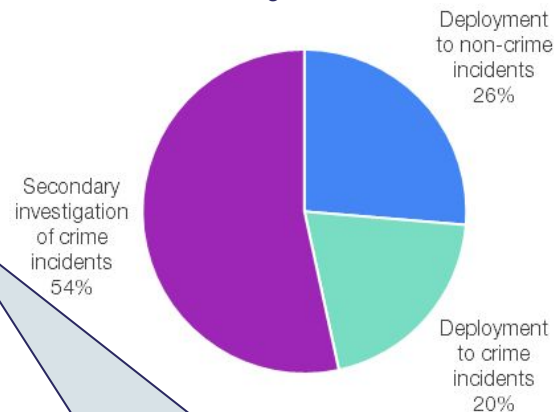
The focus groups/survey must not be seen as a replacement for a full activity-based costings exercise, but accounting for the budget and timescale of the project they have provided us with enough information to make reasonable assumptions about the lengths of time each activity might take

Overview of findings

The number of workforce hours available is already being outstripped by the hours required to meet the demand on Nottinghamshire Police. Total demand on Police is expected to continue to increase
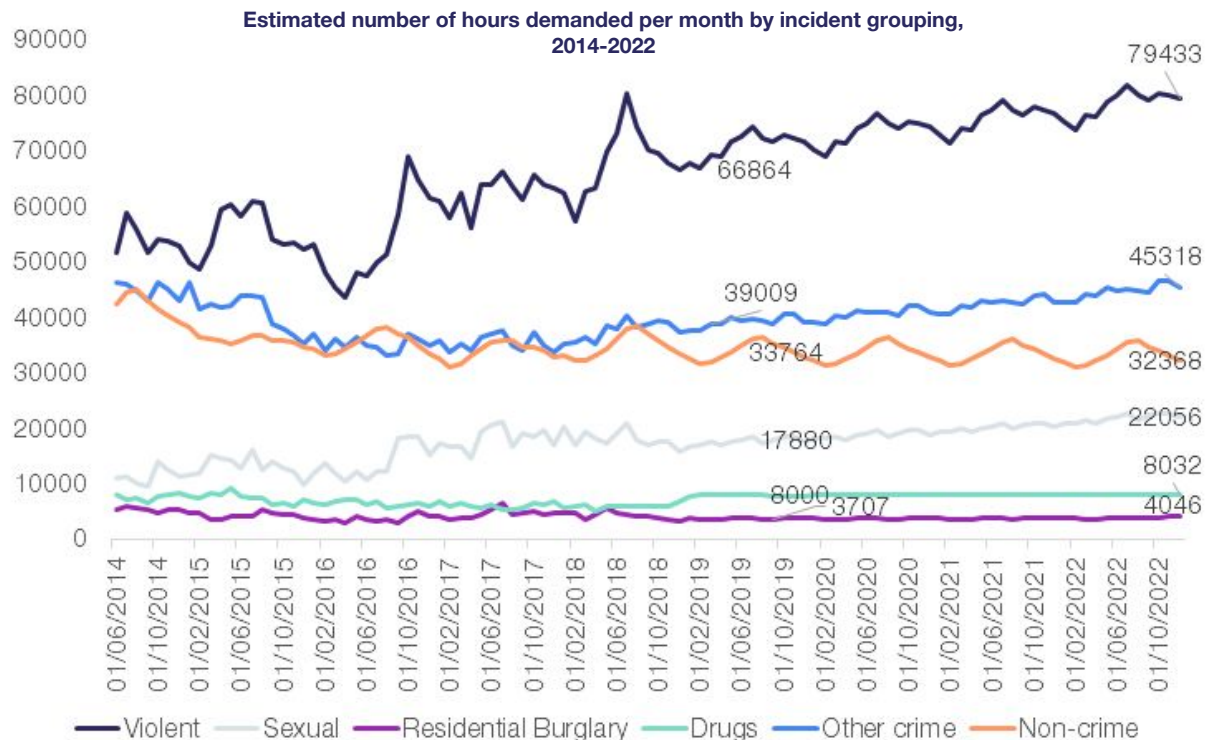
Nottinghamshire estimated police demand in hours, 2014-2022

- Deployment to non-crime incidents
- Deployment to crime incidents
- Secondary investigation of crime incidents
- Total demand in hours
- Available workforce hours

Proportionate (%) contribution to demand hours, average over 2018

Deployment to non-crime incidents 26%

Secondary investigation of crime incidents 54%

Deployment to crime incidents 20%

The greatest demand comes from the investigation of crime

Assuming all of the model inputs are correct, and the available workforce hours remains constant, **Nottinghamshire Police will not be able to meet demand over the next four years**

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Breaking down the total demand shown on the previous slide, we can see that the hours demanded by high harm offences are predicted to increase, whilst non-crime and burglary demand will remain more stable. Fraud offences will drive up demand from 'other' crime

Estimated number of hours demanded per month by incident grouping, 2014-2022

Chart values labelled: 79433, 66864, 45318, 39009, 33764, 32368, 22056, 17880, 8032, 8000, 4046, 3707

Legend: Violent — Sexual — Residential Burglary — Drugs — Other crime — Non-crime

Violent: Possession of weapons, public order, robbery, violence with/without injury, harassment, domestic crime

Sexual: Rape and other sexual offences

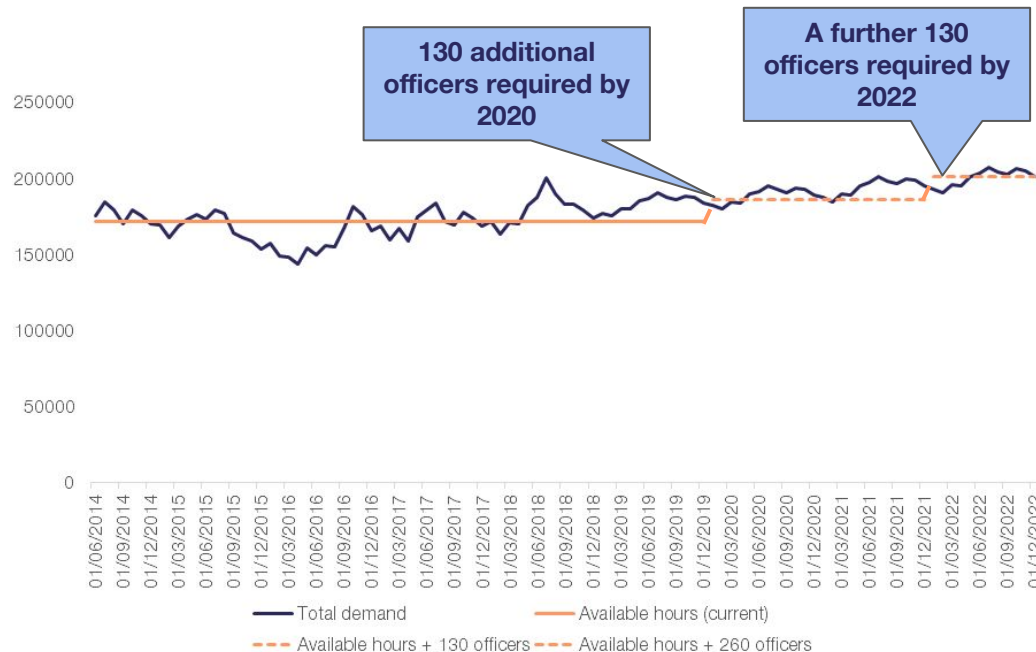**Residential Burglary:** Residential only

Non-crime: Domestic non-crime, mental health, ASB, traffic, missing persons, administration, concern for safety, other non-crime

Other crime: Arson, criminal damage, miscellaneous crime, hate crime, fraud, hoax calls, police generated, drugs possession, drugs trafficking, bicycle theft, commercial burglary, theft other, shoplifting, theft person, vehicle crime

In order to meet demand over the next four years, Nottinghamshire Police are likely to need an additional 260 officers at least based on the average hours demanded per month in 2022. However, analysis suggests that at peaks 300 could be required
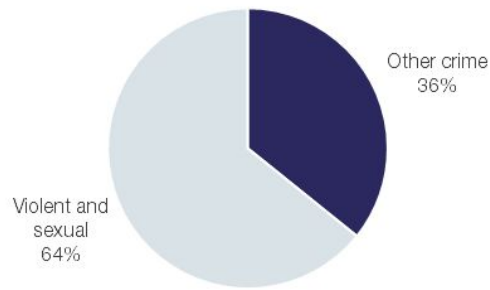
We have assumed officers deliver **70%** of their contracted hours to front-line work and have taken this into account in calculating the number of officers required to meet demand.

Assuming the cost of recruitment and training is £12,900 per officer and annual payroll costs are £30,520 per officer, the cost to recruit 130 officers by 2020, and a further 130 officers by 2022 would be **£19,224,400** over three years.

130 additional officers required by 2020

A further 130 officers required by 2022

Legend:
- Total demand
- Available hours (current)
- Available hours + 130 officers
- Available hours + 260 officers

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The changing nature of crime demand is likely to mean that the force will need to consider investing in more detectives and more specialist skills (e.g. early evidence collection for sexual offences and digital investigation skills)

Proportionate (%) contribution of violent and sexual offences to total crime demand, 2018 (not including non-crime components of demand)

Other crime 36%

Violent and sexual 64%

This proportion has increased from 53% in 2014, but is expected to stay the same up to 2023 (although the actual demand, as opposed to proportionate contribution, will be increasing)

We do not currently have enough information to propose where in the command structure additional resource should be placed, however the change in crime demand suggests:
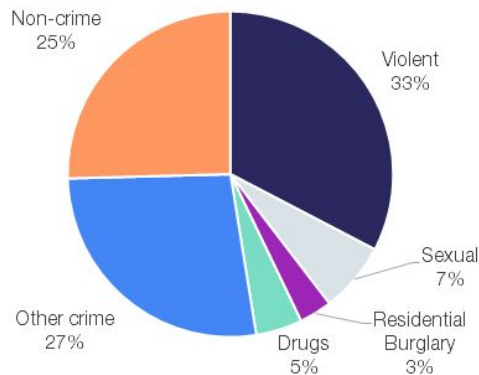
- The increasing volume of violent and sexual offences (which take longer to resolve on scene) may mean more response officers are required
- The change in crime volumes, particularly the increase in sexual offences, may mean that officers need to be more skilled in early forensic evidence collection etc.
- The increasing volume of violent and sexual offences (which take longer for secondary investigation, and are generally more complex) may mean more detectives with specialist investigation skills may be required.
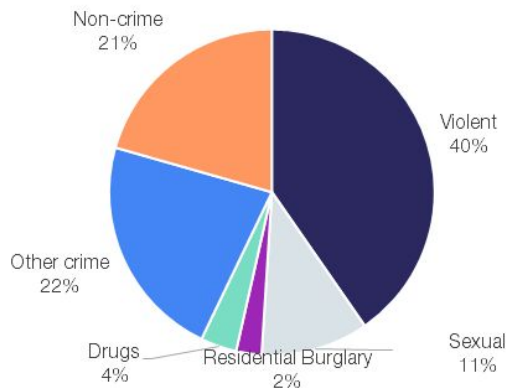
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Proportionate components of demand

The proportionate contribution of violent and sexual offences has increased from 2014 to 2018, but is expected to remain similar to 2022 (though in terms of the *absolute* demand in hours there will be an increase)
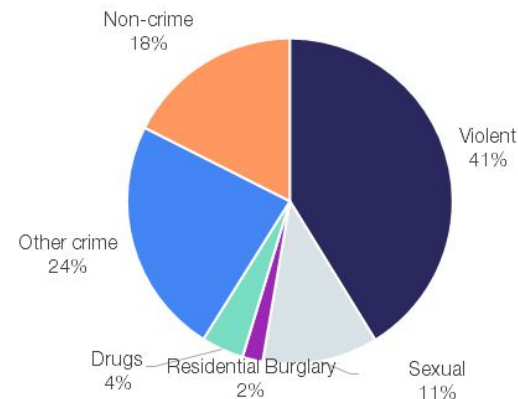
Proportionate contribution to demand hours
2014 average

Non-crime 25%
Violent 33%
Sexual 7%
Residential Burglary 3%
Drugs 5%
Other crime 27%

Proportionate contribution to demand hours
2018 average

Non-crime 21%
Violent 40%
Other crime 22%
Drugs 4%
Residential Burglary 2%
Sexual 11%

Proportionate contribution to demand hours
2022 average

Non-crime 18%
Violent 41%
Other crime 24%
Drugs 4%
Residential Burglary 2%
Sexual 11%

Violent: Possession of weapons, public order, robbery, violence with/without injury, harassment, domestic crime
Sexual: Rape and other sexual offences
Residential Burglary: Residential only
Non-crime: Domestic non-crime, mental health, ASB, missing persons, administration, concern for safety, other non-crime
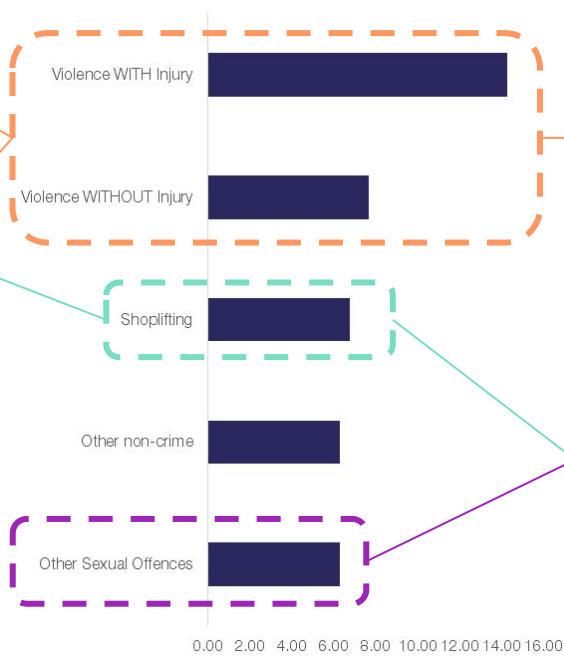**Other crime:** Arson, criminal damage, miscellaneous crime, hate crime, fraud, hoax calls, police generated, drugs possession, drugs trafficking, bicycle theft, commercial burglary, theft other, shoplifting, theft person, vehicle crime

Looking at the disaggregated components of demand, violent and sexual offences all rank highly, but shoplifting also takes up a large proportion of time

Proportionate (%) contribution to demand hours, 2014 average (5 largest contributors)

Violence WITH Injury	
Shoplifting	
Other non-crime	
Violence WITHOUT Injury	
Criminal Damage	

0.00 2.00 4.00 6.00 8.00 10.00 12.00 14.00 16.00

Proportionate (%) contribution to demand hours, 2018 average (5 largest contributors)

Violence WITH Injury	
Violence WITHOUT Injury	
Shoplifting	
Other non-crime	
Other Sexual Offences	

0.00 2.00 4.00 6.00 8.00 10.00 12.00 14.00 16.00

Proportionate (%) contribution to demand hours, 2022 average (5 largest contributors)

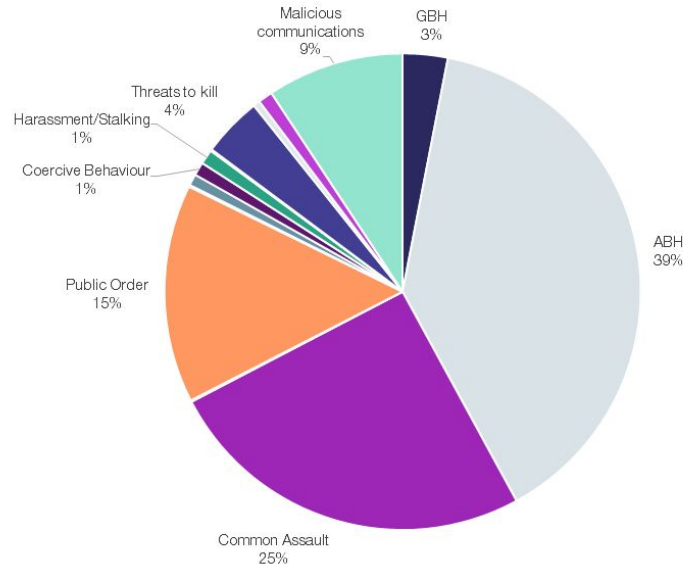|	
Violence WITH Injury	
Violence WITHOUT Injury	
Public Order	
Other Sexual Offences	
Shoplifting	

0.00 2.00 4.00 6.00 8.00 10.00 12.00 14.00

"Other non-crime" is an aggregation of a number of smaller components of demand hence why it takes up a large proportion of the total demand (in 2014 and 2018). The category includes: Abandoned/lost vehicles, animals/wildlife, suspicious circumstances, alarms, incidents passed to other agencies, police/court order/bail.

Violence with injury was the cause of 14% of total demand on Nottinghamshire Police in 2018, violence without injury 8% and harassment/stalking 5%. Looking at how this breaks down we can see that offences under the public order act (mostly harassment and stalking) have increased
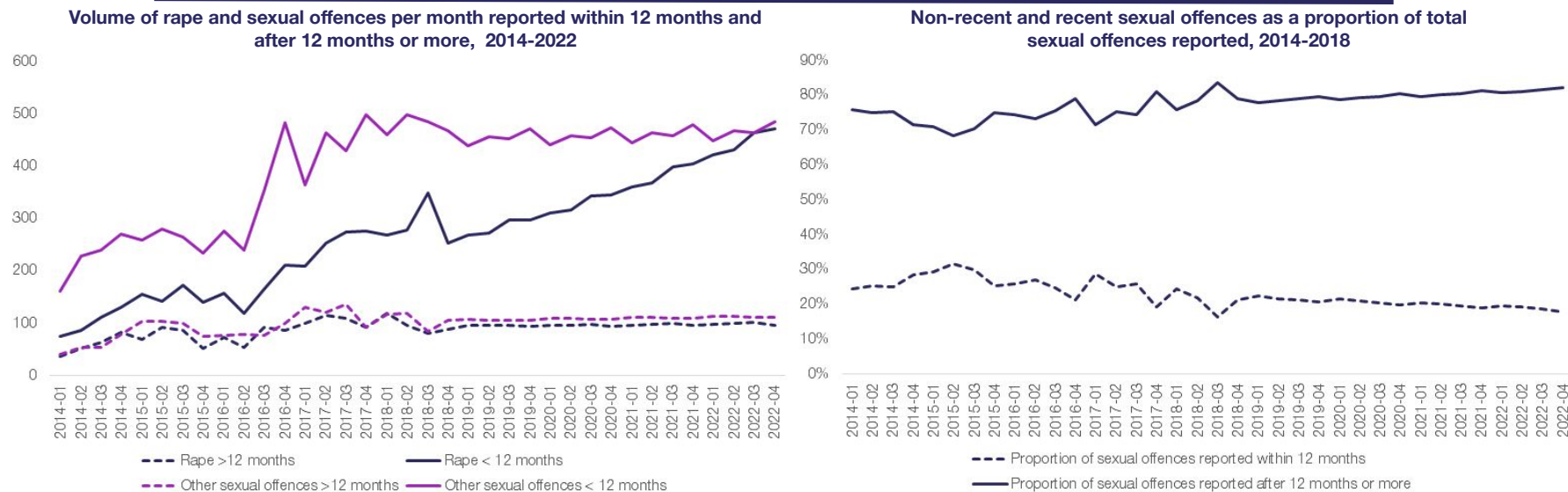
Breakdown of Violent Offences (volume), 2014

- Threats to kill 1%
- GBH 4%
- Public Order 6%
- Common Assault 32%
- ABH 54%

Breakdown of Violent Offences (volume), 2018

- Malicious communications 9%
- GBH 3%
- Threats to kill 4%
- Harassment/Stalking 1%
- Coercive Behaviour 1%
- Public Order 15%
- Common Assault 25%
- ABH 39%

The proportion of ABH offences has decreased since 2014, whilst the proportion of public order offences (harassment and stalking amongst others), threats to kill and malicious communications offences have increased. Focus group findings suggest that these offence types take longer to investigate because they are generally of a more complex nature or involving multiple victims/suspects/witnesses

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The number of non-recent sexual offences reported increased from 103 per quarter on average in 2014 to 201 per quarter in 2018. However, as a proportion of the total number of sexual offences, non-recent reporting has decreased

Volume of rape and sexual offences per month reported within 12 months and after 12 months or more, 2014-2022

- - - Rape >12 months
—— Rape < 12 months
- - - Other sexual offences >12 months
—— Other sexual offences < 12 months

Non-recent and recent sexual offences as a proportion of total sexual offences reported, 2014-2018

- - - Proportion of sexual offences reported within 12 months
—— Proportion of sexual offences reported after 12 months or more

The current model does not differentiate workload/demand between non-recent and recent sexual offences, however this could be included in a future iteration if required.

Demand by offence group

The following slides set out the demand in hours per month by offence/incident groupings and individually

Violent offences (including domestic abuse)	Page 23-27
Sexual offences	Page 28
Drugs offences	Page 29
Burglary	Page 30
Other offences	Page 31-32
Non-crime response/deployment demand	Page 33

Possession of weapon offences will remain fairly stable in terms of the demand in hours placed on the force. Clearly there is some element of the force's level of proactivity which will affect this area of demand

Hours per month demanded by possession of weapons offences, 2014-2022

Proportionate contribution

As a contribution to total demand on the police, possession of weapons incidents **increased from 1.6% of total demand in 2014 to 1.9% in 2018**. This proportion is expected to decrease to **1.8% by 2022.**

Demand stemming from public order incidents and investigations has been increasing and is set to continue to increase rapidly. Violence with and without injury are predicted to increase slightly

Hours per month demanded by Public Order, Violence with Injury,

Proportionate contribution

As a contribution to total demand on the police, public order and violence with/without injury combined, **increased from 24.0% of total demand in 2014 to 26.7% in 2018**. This proportion is expected to increase slightly to **27.5% by 2022.**

Robbery demand is predicted to be around 2000 hours a month over the next four years

Hours per month demanded by Robbery, 2014-2022

Proportionate contribution

As a contribution to total demand on the police, robbery **decreased from 1.4% of total demand in 2014 to 1.2% in 2018**. This proportion is expected to decrease slightly to **1.1% by 2022.**

Harassment has increased over recent years, which is likely to be in part from legislative changes. Using data alone demand is expected to increase rapidly, however we have adjusted the figure to account for the legislative context

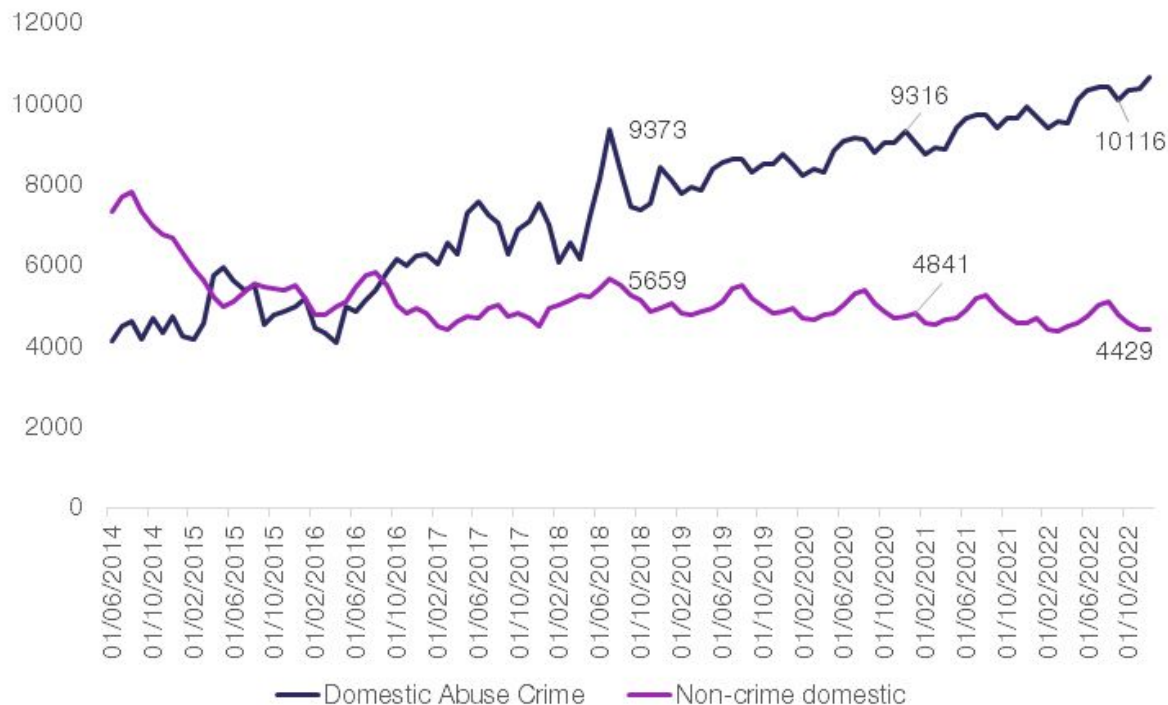**Hours per month demanded by Harassment and Stalking offences, 2014-2022**

Proportionate contribution

As a contribution to total demand on the police, harassment demand **increased from 1.5% of total demand in 2014 to 5.2% in 2018**. This proportion is expected to decrease to **5.0% by 2022.**

Projections suggest that domestic abuse crimes will continue to increase whilst non-crime incidents will start to decrease. This reflects changes in legislation, but also suggest an increase in actual demand on the force

Hours per month demanded by Domestic Abuse Crimes and Non-Crime Domestic Incidents, 2014-2022
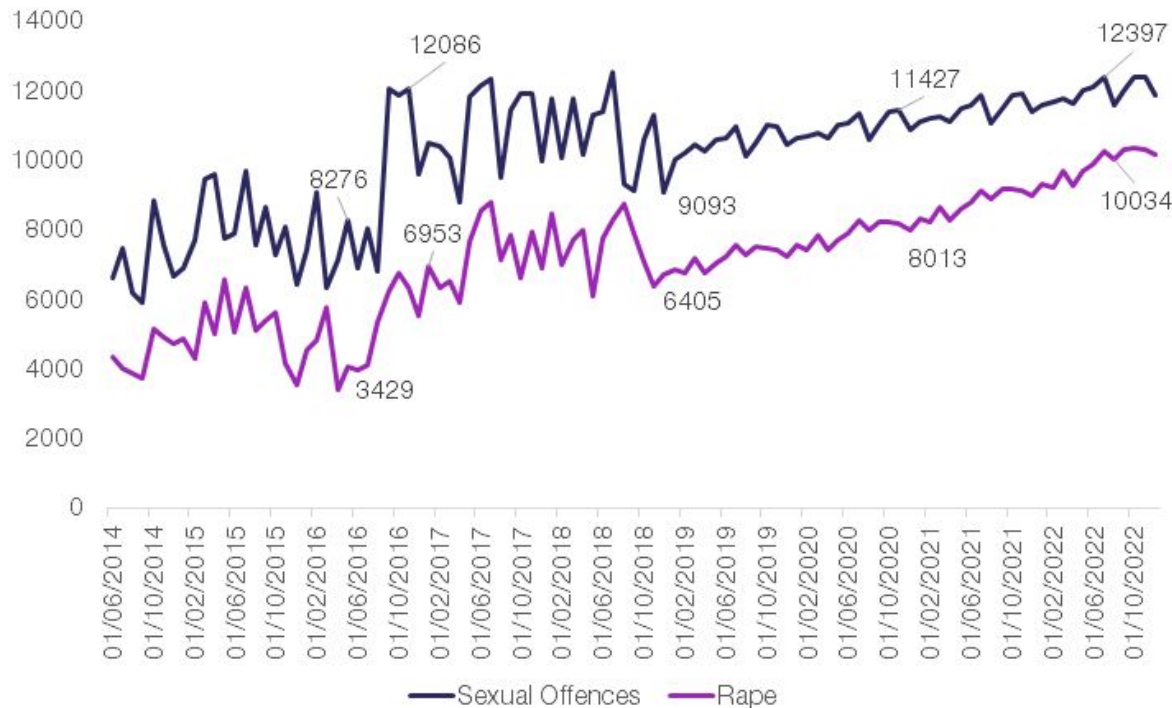

Proportionate contribution

As a contribution to total demand on the police, domestic abuse offences **increased from 0.9% of total demand in 2014 to 1.8% in 2018**. This proportion is expected to increase to **2.0% by 2022.**

Non-crime domestic incidents **decreased from 3.7% of total demand in 2014 to 2.7% in 2018**. This proportion is expected to decrease to **2.0% by 2022.**

This may in part be due to reclassifications.

The demand stemming from both rape and other sexual offences is predicted to increase to 2023

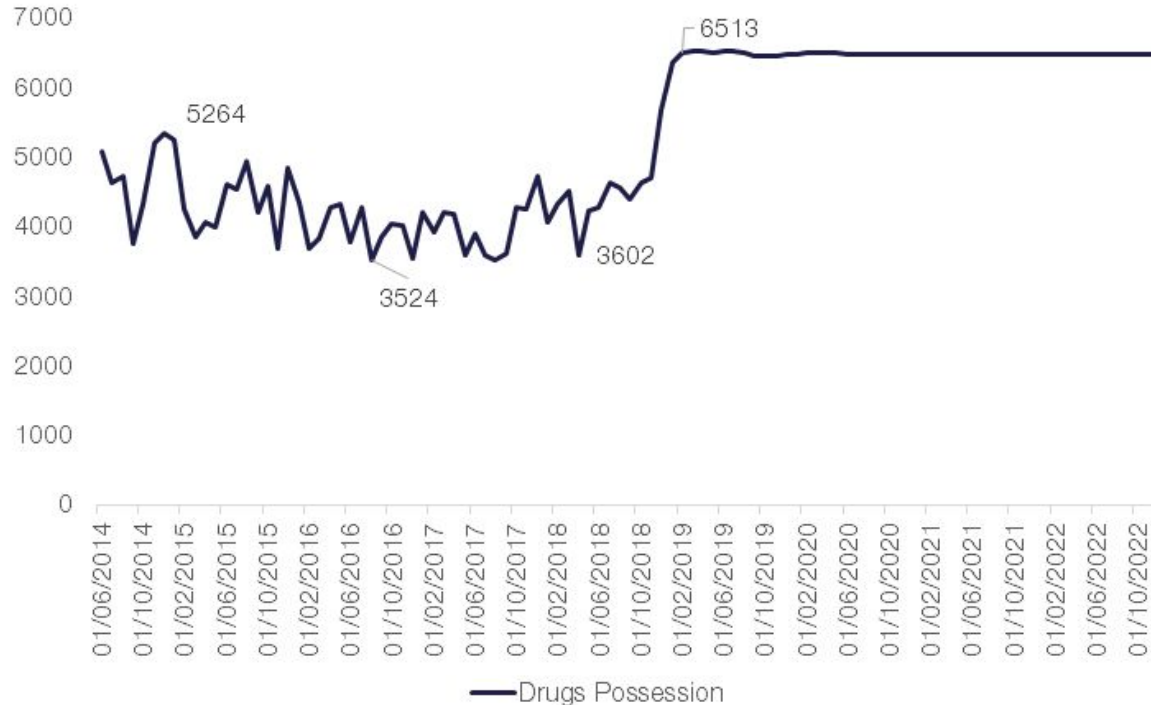**Hours per month demanded by Rape and Other Sexual Offences, 2014-2022**

Proportionate contribution

As a contribution to total demand on the police, rape and other sexual offences *combined* **increased from 7.2% of total demand in 2014 to 11.2% in 2018**. This proportion is expected to increase slightly to **11.8% by 2022.**

Using historical data alone, demand from drugs possession offences is predicted to increase rapidly, however we have adjusted the figure based on a recent surge in proactivity which is likely skewing projections
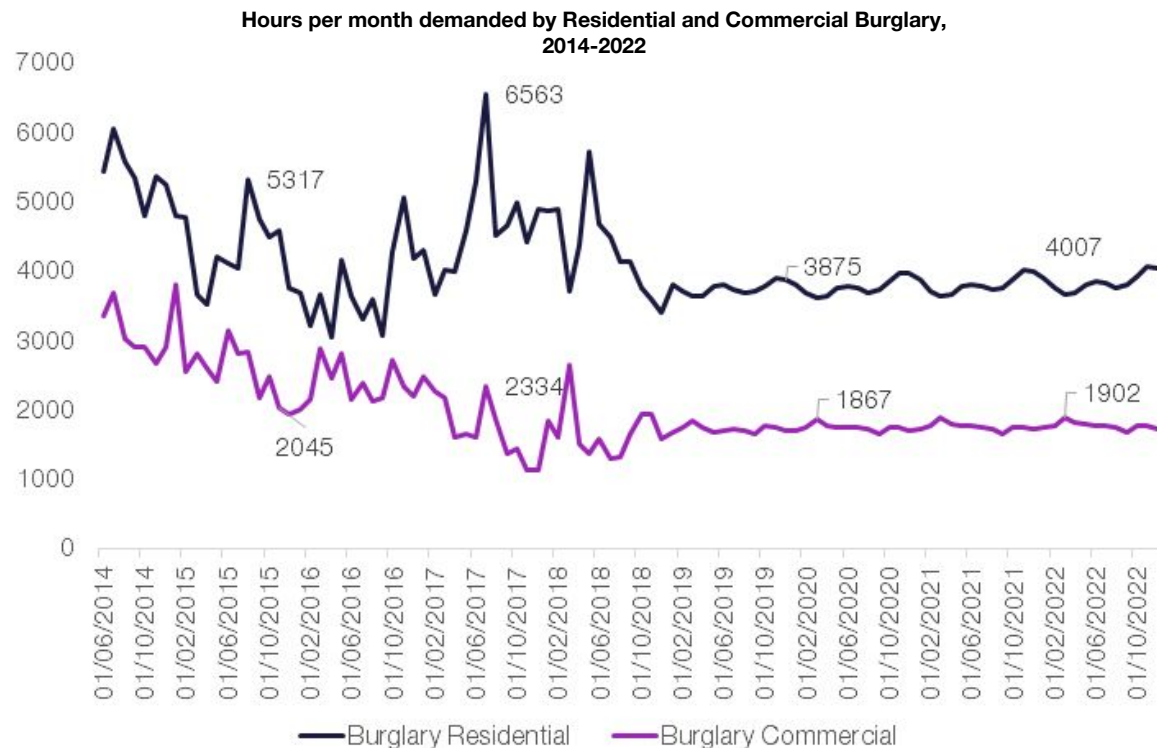
Hours per month demanded by drugs possession offences, 2014-2022

Proportionate contribution

As a contribution to total demand on the police, drugs possession offences **decreased from 2.9% of total demand in 2014 to 2.5% in 2018**. This proportion is expected to **increase to 3.3% by 2022.**

Demand stemming from burglary offences will remain fairly stable at around 5500 hours per month for residential and commercial combined

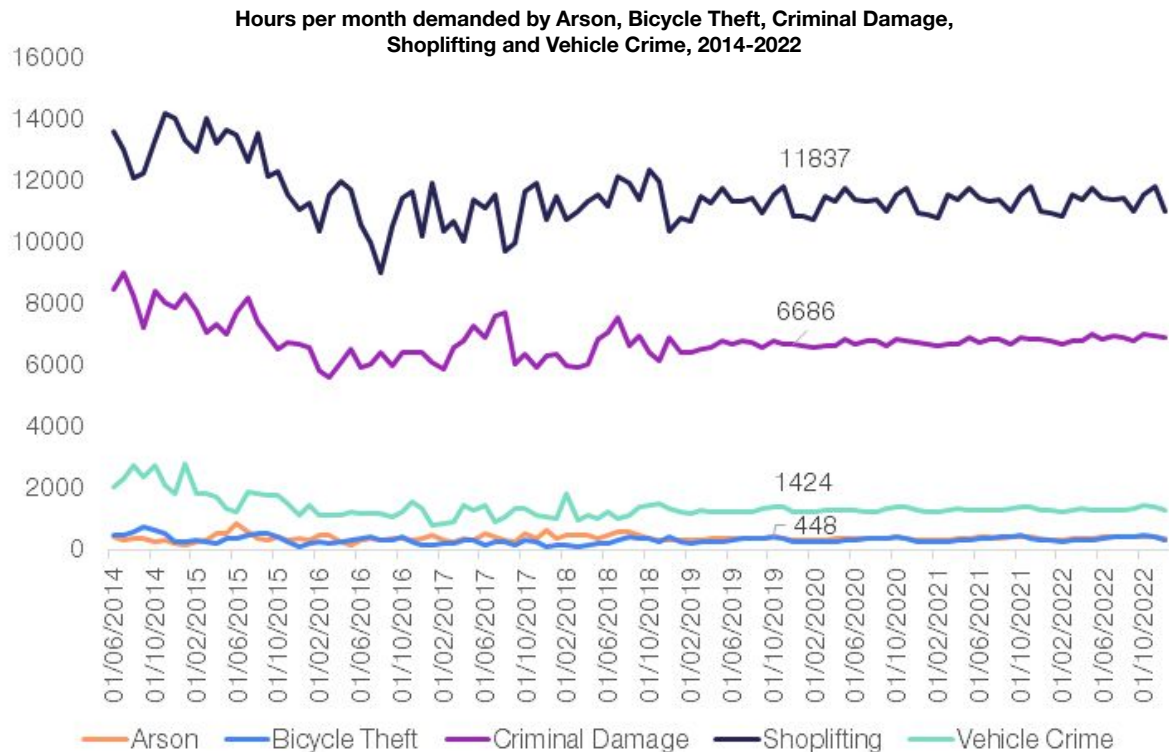**Hours per month demanded by Residential and Commercial Burglary, 2014-2022**

Proportionate contribution

As a contribution to total demand on the police, residential burglary **decreased from 3.2% of total demand in 2014 to 2.5% in 2018**. This proportion is expected to decrease slightly to **1.9% by 2022.**

As a contribution to total demand on the police, commercial burglary **decreased from 1.9% of total demand in 2014 to 1.0% in 2018**. This proportion is expected to decrease slightly to **0.9% by 2022.**

Shoplifting will continue to place a considerable demand on resources if the force continues to operate as is. Vehicle crime, bicycle theft and arson will place lower demands accounting for the prioritisation work the force has already done

Hours per month demanded by Arson, Bicycle Theft, Criminal Damage, Shoplifting and Vehicle Crime, 2014-2022

As a proportionate contribution to total demand:

Arson **increased from 0.2% of total demand in 2014 to 0.3% in 2018**. This proportion is expected to decrease to **0.2% in 2022.**
Bicycle theft **decreased from 0.3% of total demand in 2014 to 0.2% in 2018**. This proportion is expected to remain at **0.2% to 2022.**
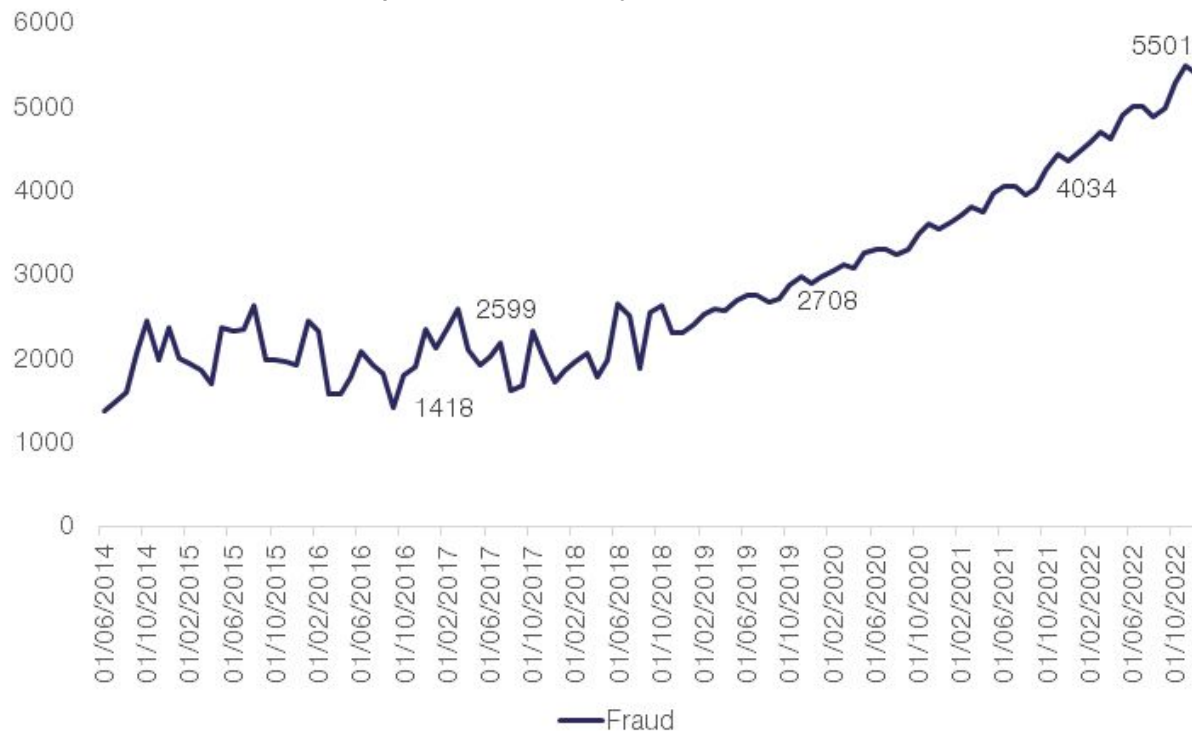Criminal damage **decreased from 4.9% of total demand in 2014 to 3.9% in 2018**. This proportion is expected to decrease to **3.6% to 2022.**
Shoplifting **decreased from 8.0% of total demand in 2014 to 6.8% in 2018**. This proportion is expected to decrease to **6.0% by 2022.**
Vehicle crime **decreased from 1.4% of total demand in 2014 to 0.8% in 2018**. This proportion is expected to decrease to **0.7% by 2022.**

Demand stemming from fraud offences is predicted to increase

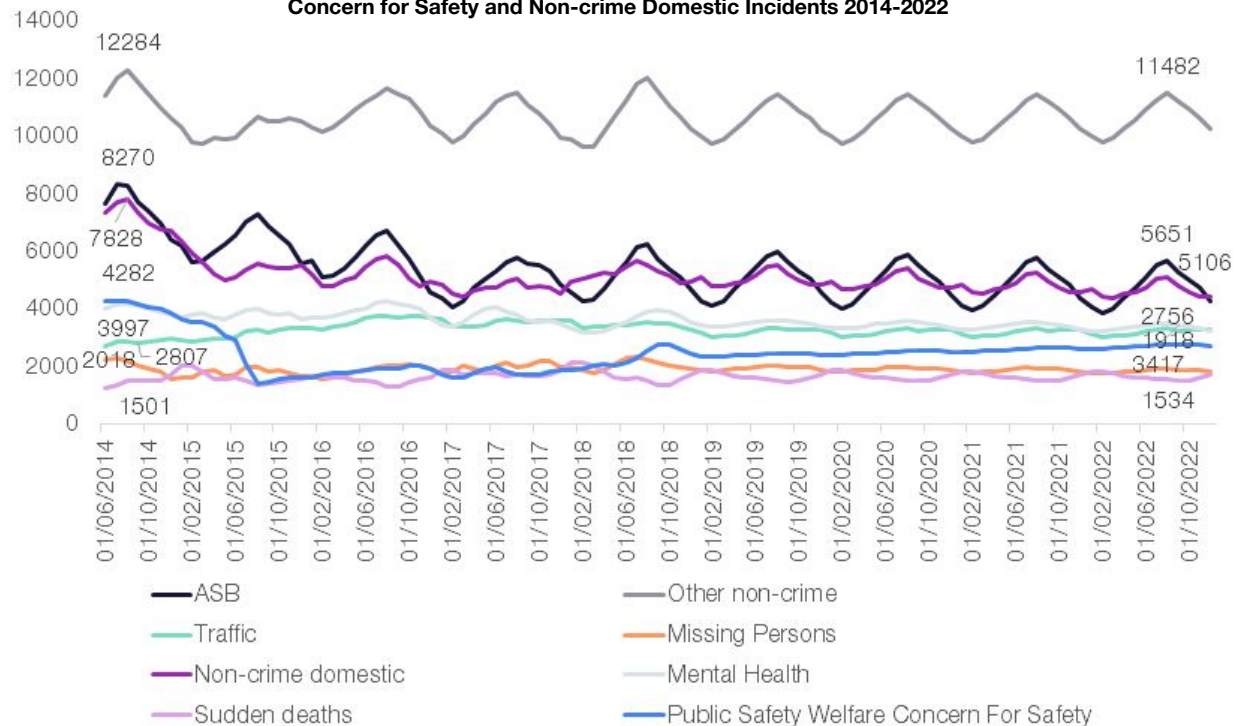**Hours per month demanded by Fraud offences, 2014-2022**

Proportionate contribution

As a contribution to total demand on the police, fraud **increased from 0.9% of total demand in 2014 to 1.3% in 2018**. This proportion is expected to increase to **2.5% by 2022.**

The hours of demand driven by responding to non-crime incidents is generally predicted to decrease, bar concern for safety incidents which will increase

Hours per month demanded by Missing Persons, Mental Health, Sudden Death, Concern for Safety and Non-crime Domestic Incidents 2014-2022

Proportionate contribution

As a contribution to total demand on the police, these elements of non-crime demand *combined* **decreased from 25.3% of total demand in 2014 to 21.2% in 2018**. This proportion is expected to decrease to **18.3% by 2022.**

Legend:
- ASB
- Traffic
- Non-crime domestic
- Sudden deaths
- Other non-crime
- Missing Persons
- Mental Health
- Public Safety Welfare Concern For Safety

Conclusions and next steps

Demand is already outstripping available hours. The force will need more officers to meet demand going forward, and will have to ensure existing staff are appropriately skilled. Further prioritisation could reduce demand, but to a limited extent

Key conclusions:

1. Demand is already outstripping available resource hours in Nottinghamshire – influencing the outcome of the spending review will be important for the force
2. Nottinghamshire has developed specialist capabilities in many areas of secondary investigation, but more may need to be done to ensure the increasing demand from violent and sexual offences can be effectively met, and positive outcomes achieved
3. Nottinghamshire has already pulled most of the available levers to improve efficiency (for example reducing deployment levels). Our model suggests there is more that could be done at the margins (to reduce deployment and secondary investigation for non priority incidents), but even doing this may not meet demand without additional resource

Outstanding questions:

1. We know that there are not enough workforce hours in aggregate, but which areas of the workforce are most in need in terms of meeting future demand? Which areas should be prioritised for additional resource?
2. To what extent are complexity factors (age of victim/suspect, number of pieces of digital evidence) impacting on the demand of different incident/offence types?
3. What is the impact of proactive and regional/national crime and security demands on the force?