

The Limits of Incapacitation as a Crime Control Strategy

Janet Chan,

Senior Lecturer, School of Social Science and Policy, University of New South Wales

1. INTRODUCTION: THE APPEAL OF INCAPACITATION

Traditionally, the rationales for sentencing an offender to imprisonment include retribution, rehabilitation, deterrence, and incapacitation. Retribution refers to the use of imprisonment as a form of punishment of the offender, a way of 'doing justice'. It is, strictly speaking, not a crime control strategy. Rehabilitation, on the other hand, aims at controlling crime through the treatment of offenders, while deterrence uses sanctions as a way of inhibiting the criminal activities of the offender ('special deterrence') or other potential offenders ('general deterrence'). Finally, incapacitation uses imprisonment as a way of isolating offenders from the rest of society so that they are unable to commit offences during their confinement. It is the incapacitation effect of imprisonment that forms the subject of this bulletin.

The research literature distinguishes between two types of incapacitation policy: *selective* incapacitation and *collective* incapacitation. Both involve the use of longer prison sentences on offenders, but in selective incapacitation the longer sentence applies only to those who are identified as high-rate offenders by some prediction method:

By selective incapacitation, we mean the prevention of crime through physical restraint of persons selected for confinement on the basis of a prediction that they, and not others, will engage in

forbidden behaviour in the absence of confinement. By contrast, collective incapacitation refers to crime reduction accomplished through physical restraint no matter what the goal of confinement happens to be (deterrent, rehabilitative, incapacitative, etc.), and where decisions about who is to be imprisoned need not necessarily entail predictions as to future conduct (Greenberg 1975, p.542).

Selective incapacitation is considered appropriate for offenders who appear to offend with unusually high frequency. The distinction between the two types of policy is important because, as subsequent sections will show, the effect of collective incapacitation is generally estimated to be fairly limited. However, selective incapacitation holds the promise of more efficient use of expensive prison resources while achieving effective crime control.

The attractions of incapacitation go beyond the simplistic 'lock 'em up' rhetoric found in the popular media. The literature has documented its rise as a penal strategy in the early 1970s in the United States (Cohen 1983; von Hirsch 1985) following general disillusionment with the 'rehabilitation ideal'. The influential work of James Q. Wilson (1975; 1983), arguing in favour of incapacitation, found eager supporters among American citizens 'fearful and angry about rising rates of serious crime' (von Hirsch 1985, p.9). If rehabilitation efforts were ineffective and deterrence effects uncertain, incapacitation was seen as a straightforward way of at least stopping convicted offenders from

committing further offences. Wilson suggested that a reduction of up to 20 per cent in the robbery rate was possible by following a strategy of imprisoning serious offenders.

This bulletin examines the research evidence on the effectiveness of collective and selective incapacitation as crime control strategies. Section 2 contains a brief introduction to the technical issues underlying research in this area. The key findings of the international literature over the past 20 years are then summarised in Section 3. The implications of these findings are discussed in Section 4.

2. TECHNIQUES FOR ASSESSING THE EFFECTS OF INCAPACITATION

Two major approaches are used in the literature to estimate the effect of incapacitation. The first, and more technically sophisticated, method is based on a mathematical model of offending activities during an offender's 'criminal career'. The second method involves simulating the effects of changes to imprisonment policy using a sample of actual offenders (Tarling 1993). Each of these methods is discussed below.

MODELLING OFFENDING ACTIVITIES

A number of studies have made use of a mathematical model derived by Avi-

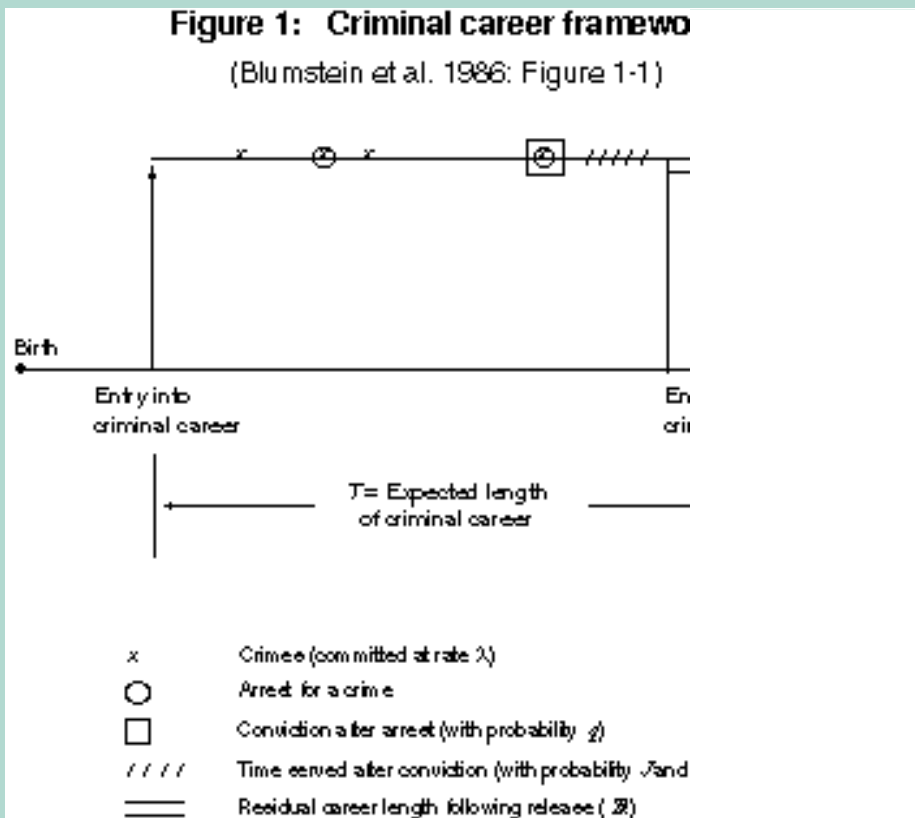
Itzhak and Shinnar (1973) and Shinnar and Shinnar (1975). The model involves postulating the notion of a 'criminal career', i.e. 'the period during an individual's lifetime when crimes are likely to be committed' (Cohen 1983,p.6). During this career, an individual is assumed to commit crime at the rate I . For example, an individual with a I of 10 crimes per year has a 0.027 probability (10/365) of committing a crime on any day in a year. The expected length of an individual's criminal career is designated by T years. Figure 1, adapted from Blumstein et al. (1986, p.21), illustrates

the key concepts involved in the model. The symbol x denotes the points in the offender's career at which a crime is committed. A circle indicates that the offender was arrested and a square indicates that the arrest led to conviction. The hatching indicates a period of imprisonment following conviction. The period following release, represented by double lines, is designated by T_R , the residual criminal career length.

The effects of the criminal justice system are taken into account by q , the probability of an offender being arrested

and convicted; J , the probability of an offender being sentenced to imprisonment following conviction; and S , the average time spent in custody. The incapacitative effect of a policy specified by qJS is then represented by I , which estimates the proportion of an offender's criminal career which has been reduced by this policy of imprisonment:

$$I = \frac{I qJS \frac{\int_0^T T_R}{T_R + S}}{I + I qJS \frac{\int_0^T T_R}{T_R + S}} \quad (1)$$



It has been shown that this proportion is equivalent to the percentage reduction in crime achieved by imprisonment.

If T_R is large compared with S , then

$$\frac{T_R}{T_R + S} \approx 1$$

approaches unity and equation (1) reduces to:

$$I = \frac{IqJS}{1 + IqJS} \quad (2)$$

An intuitive justification of equation (2) is provided by Cohen (1983, p.17). When T_R is much larger than S , the average time between incarcerations is the reciprocal of the rate of being sentenced to imprisonment per year, $1/IqJ$. If S is the average length of prison terms, the proportion of career that an offender is incapacitated is given by:

Average prison stay /
(Average time between incarcerations
+ Average prison stay)

$$= \frac{S}{(1 / IqJ) + S}$$

$$= \frac{IqJS}{1 + IqJS}$$

SIMULATING EFFECTS OF POLICY CHANGE

The second method of estimating the incapacitative effect of imprisonment is to simulate the effects of changes in imprisonment policy. Typically, researchers pursuing this kind of inquiry examine the offending record of a sample of convicted offenders and calculate the marginal incapacitative effects of policy changes. For example, the marginal benefits of imposing mandatory prison terms of various lengths can be estimated by the proportion of offences (or arrests) which would have been

prevented had these policies been applied at the time of the offender's previous conviction. As Tarling (1993, p.148) points out, the advantage of this method is that incapacitation effects can be measured directly for a variety of hypothetical policies without making any assumptions about what the offender might have done if he or she was not in prison.

UNDERLYING ASSUMPTIONS

Estimates of the incapacitative effects of imprisonment share a number of basic assumptions (see Cohen 1983). First, they assume that all offenders run the risk of being arrested and incarcerated. This appears to be a reasonable assumption for all offences which attract imprisonment as a penalty.

The second assumption is that offences which would have been prevented when certain offenders are in custody are not replaced by offences committed by other offenders. This assumption is more problematic, as the replacement of an offender is quite conceivable in certain situations:

This could happen if, for example, the offender were part of an organized illegal economic activity like drug sales or burglaries organized by a fence; in this event a replacement might simply be recruited from an available 'labour market' to continue the crimes that would otherwise be committed by the incarcerated offender. Alternately, if the offender were part of a crime-committing group, the remaining members of the group might continue their criminal activity, with or without recruiting a replacement (Cohen 1983, p.9).

The consequence of replacement or group offending is the reduction of the incapacitation effect of imprisonment. However, without more precise knowledge of the effects of incapacitation on the offending pattern of individual or group offenders in specific community settings, it is impossible to estimate the magnitude of the necessary adjustment (Zimring and Hawkins 1995).

The third underlying assumption is that the experience of imprisonment does not change the expected length of criminal career (T) or individual crime rate (I). In

other words, the rehabilitative or criminogenic effects of imprisonment are assumed to be negligible, and the deterrent effect of imprisonment on other offenders minimal. If this assumption was violated, the incapacitative effect would not be affected in the short run, but long-run estimates are more vulnerable.

A criminogenic effect of incarceration that increases individual crime rates or lengthens careers after release would perversely lead to future *increases* in the incapacitative effect that could be achieved from continuing the same incarceration policies. As the mean individual crime rate or the expected career length increases, so also does the number of crimes that can be averted through incapacitation from each man-year incarcerated. Similarly, the long-run crime reduction directly associated with incapacitation would decrease if the mean individual crime rate or expected career length declined in the future as a result of rehabilitation or deterrence. Fewer crimes would be averted by the same incarceration level. In each case, the gains from one form of crime control are counteracted by losses from another form. With criminogenic effects, failure to account for changes in criminal careers would lead to long-run underestimates of the incapacitative effect; in the presence of rehabilitation or deterrence, the long-run incapacitative effect would be overestimated (Cohen 1983, pp.9-10).

Cohen has argued that while offending rates may be altered by imprisonment at the individual level, at the aggregate level criminogenic and rehabilitative effects are likely to offset each other and produce no net effect. The deterrent effect of imprisonment may lead to an overestimate of the incapacitative effect, but the importance of this distortion is diminished if the latter is small (Cohen 1983, p.10).

A related assumption to the above is the stability of individual offending rate I over time. The notion of 'crime spurting' is a relevant consideration. This refers to irregular offending behaviour with periods of high frequency interspersed with periods of low frequency in offending. Evidence of spurting was found in the Second Rand Survey (see later discussion) where 'periods of high activity clustered just prior to the current incarceration' (Blumstein et al. 1986, p.64; also see later discussion on Haapanen 1990). Estimates of I based

on offending patterns immediately prior to incarceration are likely to be exaggerated, as is the estimated incapacitative effect of imprisonment.

COST-BENEFIT ANALYSIS

The incapacitative effect of imprisonment is, of course, not without costs. The cost of incarceration in New South Wales in 1993/94 is estimated at \$34,000 to \$50,000 per prisoner per year depending on security classification¹ (NSW Department of Corrective Services 1994, p.97). A commonly used indicator of the cost-benefit ratio of incapacitation, called the elasticity, measures the percentage change in the annual prison population required to achieve a one per cent change in the volume of crime. If we use the full Shinnar and Shinnar model, the elasticity *E* is given by:²

$$E = \frac{1 + IJS^2T_R / (T_R + S)^2}{-IJS^2T_R / (T_R + S)^2} \quad (3)$$

A similar estimate of elasticity can be obtained using the simulation method. This requires, first of all, comparing the number of years of imprisonment the sample of offenders would serve under the hypothetical policy (*S_i*) and the number of years actually served under the existing policy (*S_o*). This ratio is then divided by the percentage reduction in crime achieved by the hypothetical policy (*I*). Thus:

$$E = \frac{S_i / S_o}{I} \quad (4)$$

3. THE EFFECTIVENESS OF COLLECTIVE AND SELECTIVE INCAPACITATION

The effectiveness of both collective and selective incapacitation strategies has been evaluated in a number of overseas studies. The following is a summary of the research findings based mainly on the reviews by Cohen (1978; 1983) and Tarling (1993).

INCAPACITATIVE EFFECT OF EXISTING POLICIES

Several studies produced estimates of the incapacitative effect of existing imprisonment policies in various jurisdictions. The results are summarised below (see Cohen 1983; Tarling 1993; and Zimring and Hawkins 1995 for further details).

I. CLARKE (1974) - Philadelphia, USA

Clarke made use of data on 'arrests'³ and incarcerations of 9,945 boys in the Philadelphia Birth Cohort (Wolfgang, Figlio and Sellin 1972). Among the boys in the cohort, 381 had been incarcerated at least once by age 18. Using records of arrests and detention relating to these boys, Clarke estimated that the average annual rate of arrest for juveniles was 0.287 for whites and 0.385 for blacks. The incapacitative effect of the then-prevailing incarceration policy was estimated to be from five to 15 per cent of reported index crimes⁴ by juveniles and from one to four per cent of reported index crimes by adults and juveniles. Cohen (1983, p.13) suggests that Clarke may have underestimated the incapacitative effect because of the way individual arrest rates were calculated: Clarke assumed all the juveniles were criminally active between ages seven and seventeen without considering variations in the ages of onset and dropout in offending activity and, therefore, probably underestimated the individual crime rate, *λ*.

II. GREENBERG (1975) - USA

Greenberg's study used 1965 FBI data on criminal careers to estimate *I* for persons with at least one arrest. The upper and lower bounds of *I* were calculated at 0.50 and 3.33. The incapacitative effect of the existing imprisonment policy was estimated to be from 1.2 to 8.0 per cent of the estimated 8.34 million index crimes in 1965. Cohen's (1978; 1983) analysis suggests that Greenberg may have underestimated the incapacitative effect of imprisonment because of certain 'arbitrary assumptions' made in his

estimates. Using a different and 'equally plausible' set of assumptions, Cohen calculated the incapacitative effect to be 13.5 per cent of index crimes.

III. SHINNAR AND SHINNAR (1975) - USA

Shinnar and Shinnar's study made use of the simplified mathematical model described in Section 2 (Equation 2). Estimates of *qJS*, the expected length of imprisonment for each offence, were obtained by dividing the average daily prison population⁵ by the number of reported crimes in a year. The individual crime rate, *I*, was estimated from criminal careers data of federal offenders arrested during 1970. For safety crimes, which include murder, rape, robbery, aggravated assault, and burglary, *I* was estimated at between six and 14 reported safety crimes per year. Using the mid-point 10, Shinnar and Shinnar estimated that the existing imprisonment policy reduced safety crimes by 20 per cent. Cohen (1983, pp.17-18) suggests that the value of *I* was likely to be an overestimate. Using a value of five, she estimated that the incapacitative effect was only about 11 per cent.

IV. PETERSON AND BRAIKER WITH POLICH (1980) - California, USA

The researchers in this study made use of a survey of California prisoners in 1976 which provided self-reported data on offences and prior incarcerations. Mean annual crime rates were estimated at 0.815 armed robberies, 3.89 burglaries, and 0.82 auto thefts per prisoner. These estimates were then multiplied by the total prison population in 1976 to estimate the total number of offences which would have been committed by all California prisoners that year. Using data on reported crimes (from the FBI) and on rate of reporting (from victimisation surveys), the researchers estimated the incapacitative effect of imprisonment in 1976 in California to be 22 per cent for armed robbery, 6 per cent for burglary and 7 per cent for auto theft. Cohen's (1983) assessment of these results is that they

are likely to be overestimates since the sample of prisoners used in the survey had more serious than average prior records and prisoners were more likely to have higher crime rates than offenders in general.

V. TARLING (1993) *- England and Wales*

Tarling applied Shinnar and Shinnar's model to British data for 1975, 1980 and 1986. The values of *S*, the average time in years spent in custody, were estimated by using Prison Index information. The probability of being sentenced to imprisonment for an offence, *qJ*, was estimated by the ratio between the number of people sentenced to imprisonment and the number of known offences. The values of *I* were estimated by examining arrest records of samples of offenders (making allowance for the proportion of offences which result in an arrest). The incapacitative effect of imprisonment was estimated to be between 5.8 and 9.0 per cent. These estimates were reduced further if corrections were made for co-offending. The elasticity (the percentage change in annual prison population required to achieve a one per cent change in the level of crime) was estimated to be between 16 and 20 per cent.

VI. ZIMRING AND HAWKINS (1995) *- California, USA*

Zimring and Hawkins saw the phenomenal rise in the California prison and jail population (from 52,000 to 170,000) during the 1980s as a 'natural experiment' which allowed an examination of the effects of increased imprisonment on crime rates. The researchers used four different projection techniques to estimate the levels of crime the State would have experienced if there had been no change in imprisonment policy. Their analysis produced a number of estimates for the incapacitative effect of the increased use of imprisonment for seven index felonies (larceny, robbery, assault, vehicle theft, rape, homicide and burglary). The estimates varied somewhat according to

the method of projection. The median estimate for the aggregate of all seven offences was the reduction of 3.5 offences per person-year of imprisonment. One way of interpreting this result is that the more than tripling of the prison population during the 1980s was associated with a decrease of only about 15 per cent in the volume of crime in 1990 (Zimring and Hawkins 1995, p.117). The researchers found, however, that when the results were analysed by offence type, more than 90 per cent of the crime reduction occurred in burglary and larceny; the reductions in the other offences were 'weak to negligible' (ibid., p.101). Further analysis of arrest data cast doubt on the conclusion that the rise in imprisonment was responsible for the decline in burglary and larceny, since the reduction in these offences was concentrated on juvenile offenders who were less likely to be incarcerated. The researchers suggested that while these results were not conclusive, their study demonstrated 'both the dangers of premature conclusion from non-experimental research data and the values of multiple measurement' (ibid., p.101).

COLLECTIVE INCAPACITATION

Several studies measured the marginal incapacitative effects of changes to existing imprisonment policies. These changes usually involve either increasing the average length of sentence or introducing mandatory prison terms for repeat offenders. The results are summarised below (see Cohen 1983 for further details).

I. GREENBERG (1975) *- California, USA*

Greenberg made use of arrest data in California in 1971. Those who were on parole at the time of arrest were examined to estimate the proportion of arrestees who had been released from prison one year prior to the 1971 arrest. The incapacitative effect of adding one year to the prison terms of these offenders was estimated to be three to four per cent of index offences.

II. VANDINE, CONRAD AND DINITZ (1977, 1979) *- Ohio, USA*

The researchers made use of the criminal records of 342 adult offenders processed by the courts in 1973 who were involved in violent felonies (murder, rape, robbery and aggravated assault) in Franklin County, Ohio. By examining the prior records of these individuals the researchers estimated that a five-year mandatory prison term following any felony conviction would have prevented 17.4 per cent of the violent felony arrests in 1973. If the five-year mandatory term was applied only to repeat felony convictions, the incapacitative effect was reduced to 6.0 per cent.

III. PETERSILIA AND GREENWOOD (1978) *- Colorado, USA*

The researchers examined the prior criminal record of a random sample of 625 offenders convicted of serious offences in District Court from 1968 to 1970 in Denver, Colorado. The incapacitative effect of a mandatory five-year sentence following any felony conviction was estimated at 31 per cent of the violent crime convictions, and 42 per cent of the burglary convictions during the two years. If the mandatory term was applied to repeat felony convictions only, the incapacitative effect was reduced to 16 per cent for violent convictions and 15 per cent for burglary convictions. These estimates were considered inflated since offenders with serious prior convictions were likely to be over-represented in the sample because decisions such as 'early dismissals and charge reductions by the prosecutor as well as the final charge at conviction, are influenced by a prior record of felony convictions' (Cohen 1983, pp.25-26).

IV. COHEN (1982) *- Washington, DC, USA*

In this study Cohen made use of prior criminal histories of adults who were arrested in 1973 in Washington, DC, for a 'criterion offence' - murder, rape, robbery, aggravated assault, burglary or auto theft. Her estimate of the incapacitative effect of a five-year

mandatory prison term after any conviction for a criterion offence was 13.7 per cent of the criterion arrests in 1973. The effect of a mandatory five-year term imposed only after repeat convictions on her estimation would be only 3.8 per cent.

V. TARLING (1993) - *England and Wales*

Tarling made use of data from three representative samples of offenders convicted of indictable or serious non-indictable offences taken in 1957, 1971 and 1987. The incapacitative effect of imposing a mandatory 18 month sentence⁶ of imprisonment was estimated to be between 18.5 to 28.8 per cent of offences.

SUMMARY

The above studies produced quite different estimates of the incapacitative effects of a number of hypothetical policies, ranging from increasing the length of imprisonment by one year to various mandatory sentences upon first or repeat convictions. The highest estimates of the incapacitative effects were cited by Petersilia and Greenwood (1978) for a policy of five-year mandatory imprisonment for any felony conviction, i.e., 31 per cent of violent convictions and 42 per cent of burglary convictions. These figures, as pointed out before, are likely to be overestimates because of the nature of the sample. On the other hand, estimates of the incapacitative effect of imposing a five-year mandatory sentence following repeat convictions were as low as 3.8 to 6.0 per cent in some studies (Cohen 1982; Van Dine et al. 1977). Cohen's (1983) assessment was that a 10 to 20 per cent incapacitative effect was a reasonable estimate for most of these hypothetical policies. In fact, the *maximum* potential benefits of incapacitation are not at all striking. Cohen's (1982) analysis of adult index arrestees in 1973 in Washington, DC found that the incapacitative effect of imposing life sentence after any previous adult conviction for a 'criterion' offence (homicide, rape, robbery, aggravated

assault, burglary, or auto theft) was only 24 per cent. The reason for this rather low 'ceiling' was quite simple: 21 per cent of the Washington, DC sample had no prior arrests as adults and another 55 per cent had prior arrests but no prior convictions for these offences. Thus, mandatory sentences of any length would not have prevented 76 per cent of the adult arrests during that year. Obviously, this ceiling on incapacitation could have been raised if the probabilities of arrest and conviction were higher.

IMPACT ON PRISON POPULATIONS

While the crime reduction effects of collective incapacitation are generally modest, the effects of these policies on the size of the prison population appear to be quite substantial. For example, the five-year mandatory sentence policy applied to any felony convictions (or convictions for criterion offences) would lead to an increase in prison population for these offences of 450 per cent in Petersilia and Greenwood's (1978) sample, 523 per cent in the Van Dine et al. (1979) study and 310 per cent in Cohen's (1982) study.

Cohen (1978, Appendix C) presented estimates of elasticities E for 29 States in the US. The results suggest that to achieve a ten per cent reduction in index offences, assuming an individual offending rate of $I = 5$ index crimes per year and an expected length of imprisonment $qJS = 0.02$ years, the prison population would have to be more than doubled⁷ (E varies considerably from 3.37 in Mississippi to 32.63 in Hawaii, with E greater than 10 in two-thirds of the States). Tarling's (1993) estimate in his study of England and Wales was even less favourable: to reduce crime by ten per cent, an increase in the use of imprisonment of 220 to 280 per cent would be required ($E = 22$ to 28 per cent).

To estimate the short-term impact of State prison population⁸ on crime rates, Marvell and Moody (1994) used advanced econometric time-series regression techniques on imprisonment

and crime rates for the years 1971-1989 over 49 States in the US. They estimated that each 10 per cent increase in the State prison population resulted in 1.6 per cent fewer index crimes per year. If this figure was translated into the elasticity defined earlier, the value of E would be 6.25. In other words, to achieve a ten per cent reduction in index crimes, the prison population would have to increase by 62.5 per cent. The reduction effect estimated by Marvell and Moody varied considerably by offence type: 0.65 per cent for homicide, 1.1 per cent for rape, 2.5 per cent for burglary, 2.6 per cent for robbery, and 2.0 per cent for vehicle theft. The overall 1.6 per cent estimate turned out to be the same as the 'best estimate' produced by Spelman's (1994) results based on the 1978 Rand Surveys which included federal prison as well as local jail inmates (see next section for more details on the Rand Surveys). Although Marvell and Moody suggested that the 'real impact' of imprisonment was much greater than their estimate of 1.6 per cent (perhaps as high as 3.3 per cent), they cautioned that their study was limited to the short-term impact of State prison population on index crime. Long-term impacts as well as impacts of population changes in local jails, federal prisons and juvenile detention facilities were not considered.

SELECTIVE INCAPACITATION

The initial appeal of selective incapacitation as a crime control strategy is fairly obvious. The previous section has shown that relatively modest reductions in crime (e.g. about 10 per cent) as a result of collective incapacitation are likely to be accompanied by a more than 100 per cent increase in the prison population. This may be an unacceptable trade-off for jurisdictions with limited capacities to finance such an expansion of the prison system. For example, a doubling of the prison population in a State such as New South Wales, which already has over 6,000 prisoners on an average day, would incur additional operating costs of over \$200 million per year. The indiscriminate use of mandatory prison

sentences on all convicted offenders may also be considered Draconian and contrary to the well-established principle of proportionality in punishment. Selective incapacitation addresses both of these concerns: incapacitation policies will be *targeted* at a small number of high-rate offenders (whose prior records would justify more severe penalties in any case), so that the crime-reducing benefits of such policies are likely to increase without leading to large increases in the prison population.

The plausibility of selective incapacitation was enhanced by studies which showed that the statistical distribution of individual offending rates *I* is highly skewed. In the Rand Inmate Surveys of 1976 and 1978, for example, self-reported rates of offending varied substantially: half of the prisoners reported having committed fewer than four robberies per year (while free), while about five per cent of the prisoners reported having committed more than 180 robberies per year (see Visher 1986). If these high-rate offenders could be identified and given longer prison sentences, the proportion of offences prevented would have been substantially increased with only modest increases in the prison population.

The effectiveness of selective incapacitation has been examined by a number of studies. The results are summarised below.

I. THE RAND INMATE SURVEY - California, Michigan and Texas, USA

Several studies of the offending patterns of prisoners were undertaken by the Rand Corporation in the 1970s. The most extensive and controversial study is the survey undertaken in 1978 (often referred to as the 'second inmate survey'). Full details of the survey are found in Chaiken and Chaiken (1982), Greenwood (1982) and Visher (1986). Only a short summary of the findings and the issues will be discussed here. The survey covered cohorts of incoming prisoners from three States: California, Michigan and Texas. Prisoners were asked to complete a detailed

questionnaire on their background, attitudes, employment history and offending behaviour (juvenile offending, adult crime two years prior to current arrest, use of illegal drugs and alcohol). The final sample consisted of 2,190 prisoners (see Visher 1986 for a full discussion of the methodological weaknesses of the survey).

Three main findings from the survey are relevant to incapacitation policy. First, the survey confirmed the highly skewed distribution of the individual offending rate *I*. For example, the median and the 90th percentile⁹ values were 5.45 and 232 for burglary, 5.00 and 87 for robbery, 8.59 and 425 for theft (Visher 1986, p.167).

Secondly, the survey provided data for Chaiken and Chaiken (1982) to develop a typology of offenders using multivariate techniques.¹⁰ Six major types represented 62 per cent of the sample: violent predators (15 per cent of sample), robber – assaulters (8 per cent), robber – drug-dealers (9 per cent), low-level robbers (12 per cent), burglar – drug-dealers (10 per cent) and low-level burglars (8 per cent). The most active 10 per cent of violent predators reported having committed at least 154 robberies and 516 burglaries a year.

Finally, the survey provided data which allowed Greenwood (1982) to identify high-rate offenders using self-reported information. Greenwood developed a simple, seven-point scale using variables that correlated well with high rates of burglary and robbery. Respondents were given a score of one or zero depending on the presence or absence of each of the following seven attributes: convicted previously for the same charge, incarcerated more than 50 per cent of the preceding two years, convicted before age 16, served time in state juvenile facility, used drug in preceding two years, used drugs as a juvenile, and employed less than 50 per cent of preceding two years. The scores were added together and a respondent was classified as a low-rate (scoring 0 or 1), medium-rate (scoring 2 or 3), or high-rate (scoring 4 or more) offender.

Greenwood used the model of incapacitation developed by Avi-Itzhak and Shinnar (1973) and suggested that a policy of selective incapacitation would have significant crime control benefits. For example, if all convicted robbers predicted by the seven-point scale to be high-rate robbers were given an eight-year prison sentence while all the other robbers were given a one-year sentence, the robbery rate could be reduced by a maximum of 20 per cent without any increase in the prison population.

Greenwood's (1982) study was enthusiastically received by policy makers and even put into practice through legislation or informal guide in some States. Several critical reviews of the study, however, raised serious ethical (von Hirsch 1985; see later section) as well as technical concerns about the results (Cohen 1983). Technical problems include the use of self-report data among convicted offenders. Any concealment or exaggeration of offending activities would have contributed to the skewness of the distribution of offending rates. The accuracy of *I* estimates is also questionable, since they depend on the assumption that offenders exhibit stable offending patterns over time. If even a minority of the sample of respondents operate erratically ('crime spurting'), the estimates of *I* may be inflated. The heavy reliance on self-reported information in Greenwood's (1982) seven-point scale was another source of criticism. If Greenwood's policy was put into practice, the prediction instrument would have to be based on incomplete official records. Cohen (1983, p.49) also found that the level of 'false positives' in Greenwood's predictive scale was as high as 55 per cent, i.e. over half of those classified as high-rate offenders were actually low- or medium-rate offenders. Greenwood's claim about the crime-reducing effect of selective incapacitation was also questioned because the prediction model was based on retrospective data without any validation on an independent sample.

Because of the policy significance of this study, the data of the Rand Survey were carefully scrutinised and re-analysed by Visher (1986). The results of Visher's re-analysis are summarised below.

The re-analysis confirmed that the distribution of *I* among the sample of prisoners was highly skewed, even though minor errors may have been introduced into the estimates. However, Visher found that the estimates of *I* for robbery and burglary were sensitive to 'choices in computation, such as the interpretation of ambiguous survey responses, the treatment of missing data, and the computation of the length of respondents' "street time" (Visher 1986, p.204). Visher also raised doubts regarding the veracity of some respondents: the large numbers of convicted robbers (28 per cent) and burglars (30 per cent) who reported that they had not committed any robberies or burglaries in the past one to two years and the few respondents who admitted to committing the equivalent of 1,000 or more robberies and burglaries per year. With respondents who were incarcerated for long periods of time or those who had short but 'intensive' street time, it was difficult to obtain accurate 'annualised' rates of offending. Finally, Visher suggested that further research was necessary to explain the considerable variation in the values of *I* across the three State samples.

The accuracy of Greenwood's (1982) scale for identifying high-rate offenders was found to be disappointing even when applied to the original survey sample: 39 to 66 per cent of the high-rate offenders were incorrectly classified¹¹ depending on the offence and the State (Visher 1986, p.195). The scale was found to provide an 'improvement over chance' (random prediction) of only 19 per cent for burglary in Michigan but 57 per cent for robbery in California. The scale was also better at identifying low-rate offenders than high-rate offenders. Visher's re-analysis also found that the incapacitation effect calculated by Greenwood (1982) was overestimated. Instead of a 20 per cent reduction in robbery, Visher found that a reduction

of 13 per cent was the most that could be achieved by doubling the sentence length from 4 to 8 years for high-rate offenders. More troubling, however, is Visher's suggestion that if the same prediction scale and sentencing policy were applied to Michigan and Texas, the crime rate would in fact *increase* and the prison population decrease:

With 8-year sentence lengths for predicted high-rate robbers and 1-year jail terms for all other robbers, the robbery rate in Michigan would increase by 33 per cent, but the prison population would decrease by nearly 50 per cent. ... because incarcerated high-rate offenders ... are apparently a very small group in Michigan prisons and jails, compared with California. Moreover, all convicted robbers in Michigan are already serving long prison terms (an average of 5 years) and few robbers are sentenced to jail... [M]ost robbers (those defined as low- and medium-rate) would spend a smaller portion of their offending careers in prison or jail under this policy than under Michigan's current policy and would have more 'free time' in which to commit more crimes (Visher 1986, pp.201-2).

The anticipated 13 per cent incapacitative effect in California was expected to decline when applied to any new population ('shrinkage'¹²) and especially when applied to a population of convicted offenders rather than prisoners. The effect would also decline if official records rather than self-report data were used for prediction.

II. HAAPANEN (1990) - California, USA

Haapanen's study was based on three sub-samples of serious offenders: 1,308 offenders who were institutionalised as wards of the California Youth Authority during the 1960s, 175 adult prisoners who were convicted of robbery or burglary with no history of juvenile incarceration, and 98 adult probationers sentenced to jail or probation for robbery or burglary and who had no prior juvenile or adult incarcerations. Arrest histories and other social and historical background information were obtained from prison and parole files for 15 to 20 years.

The study found evidence to question

some of the assumptions and the results of selective incapacitation strategies. The most significant finding was that individual offending rates tend not to be stable over time. Using arrest rates as estimates of offending rates, Haapanen's analysis found that individual arrest rates showed substantial instability from one four-year period to the next. Few offenders consistently maintained the same level of arrest rate over four-year periods: 'While most of the sample had at least one four-year period in which their rates of arrest were among the highest third, only a minority of these (28% over three periods and 12% over four periods) were in the highest thirds over *most* of these periods' (Haapanen 1990, p.140). These results suggest that models that assume stable offending rates may overestimate the incapacitative effect of selectively locking up individuals who were identified as high-rate offenders at particular times.

Haapanen also pointed to two important patterns in his data. First, arrest rates showed a clear 'uncharacteristic' increase during the four-year period immediately prior to incarceration. This suggests that it would be inappropriate to use the arrest rates of this period to estimate the average rate of offending. Secondly, arrest rates for the years following release from imprisonment tended to be lower than expected. This trend suggests that the crime-reducing effect of extending the prison sentence might be somewhat less than predicted using pre-incarceration arrest rates.

Finally, using data on arrest and incarceration during the 12-month period after a prisoner had been released from prison, Haapanen estimated the potential incapacitation effect of adding one year to the prison sentence. The results were generally less favourable than other studies cited: keeping *all* offenders in prison for an additional year would reduce crime by only 3 per cent, while keeping those with the highest post-prison arrest rates in prison for an additional year would have reduced crime by less than 2 per cent.

III. BERNARD AND RITTI (1991)

The researchers made use of data from the birth cohort from the Wolfgang, Figlio and Sellin (1972) study to determine marginal costs and benefits of nine hypothetical incapacitation policies. Marginal benefits were measured by the number of police contacts and felony adjudications that would have been prevented under the hypothetical policy, while marginal costs were estimated by calculating the juvenile incarceration rate that would result from the policy compared with existing rates.

Estimates of costs and benefits were based on 627 boys in the cohort who accumulated at least five police contacts. Each incapacitation policy involved holding a youth in institution from the time of an 'incapacitating event', such as the second arrest, the second adjudication or the second institutionalisation, until his 18th birthday. A police contact or felony adjudication was counted as having been prevented if it occurred following the hypothetical incapacitation.

The researchers concluded that there was no evidence that selective incapacitation was a practical strategy for controlling crime:

Our least harsh hypothetical policy would have reduced serious adjudications by 6% but only by incarcerating between two and six times as many juveniles as at present. Our most harsh policy would have reduced serious adjudications by 35% but only by incarcerating between 9 and 22 times as many juveniles as at present. In addition, the policy that 'selectively' focused on more serious offenders produced declining marginal benefits per offender,¹³ apparently because these offenders were already being locked up by judges (Bernard and Ritti 1991, pp.50-1).

ETHICAL ISSUES

While the research evidence from a number of studies challenged the original optimistic assessment of selective incapacitation strategies, concerns were also raised by those who found the strategy morally and philosophically objectionable. Critics argued that sentencing of offenders should be based

on 'just desert' and proportionality principles: offenders should be punished according to the seriousness of the offence they were convicted for, not according to a prediction of future behaviour (see, for example, von Hirsch 1985).

The high rate of 'false positives' associated with Greenwood's (1982) prediction model means that a substantial proportion of low- or medium-rate offenders would be misclassified as high-rate offenders and would receive much more severe sentences than they would otherwise receive. The use of variables unrelated to the current offence in the prediction scale also means that sentencing would be based on factors not considered relevant to assessing the gravity of the offence. One study indicated that 'disadvantaged groups in society (blacks, women, and the poor) are more likely to receive higher Greenwood scale scores, and thus designation as high-rate offenders, even when controls for prior offences are included' (Decker and Salert 1987, p.287). More recently, Long (1993) argued from a 'rights-based tradition of political morality' that selective and collective incapacitation strategies exceed the limits of the legitimate exercise of state powers in a democratic society.

UNINTENDED CONSEQUENCES

Most of the research studies cited in this bulletin refer to *hypothetical* incapacitation policies and produce estimates of their likely effects if implemented. These estimated effects implicitly assumed that the hypothetical policies were *fully implemented* by the criminal justice system as intended. Yet, detailed evaluation studies of sentencing reforms in several jurisdictions in the United States suggest that the impact of these reforms was not always as anticipated (see Cohen and Tonry 1983 for a review). Although there appeared to be formal compliance with the requirements of mandatory sentences, there was also evidence of 'adaptive responses' by court practitioners to

circumvent the controls of legislation on their discretionary powers.

An evaluation of the Michigan Felony Firearm Statute¹⁴ introduced in 1977, for example, found that there was a slight increase in the average sentence for felony offences, but the proportion of all defendants receiving prison sentences did not increase. Research results suggest that 'waiver trials' were used to avoid the mandatory two-year sentence: judges either gave explicit prior indications that they would dismiss the firearm charges at trial or indicated that they would consider every possible defence and require evidence of every element of the charge. There was also evidence that judges had in fact adjusted their prior tariff to take into account the two years added by the new law.

Research on a similar law in 1975 in Massachusetts¹⁵ found evidence of a substantial increase in acquittals among defendants charged with carrying a firearm and those also charged with robbery. Appeals to the superior court showed a large increase and the rate of absconding of defendants also increased.

In another study, it was found that the introduction of severe mandatory sentences for drug offences in New York in 1973 led to a marked increase in the severity of prison sentences. However, because the law forbade dismissal of charges through plea bargaining, trial rates and court delay increased dramatically, leading to a large increase in backlog of drug cases.

These results, of course, do not imply that incapacitation policies will *necessarily* lead to adaptive responses by practitioners. They merely suggest that policies, even when prescribed by legislation, do not always lead to consequences intended by advocates of these policies. It is not inconceivable that judicial officers and lawyers, who play an important part in implementing such selective incapacitation policies, might respond 'in ways that reduce the disparity that arises from a sentence of 8 years for predicted high-rate offenders compared with 1 year for other convicted persons' (Visher 1986, pp.205-6).

In Western Australia, where *The Crime (Serious and Repeat Offenders) Sentencing Act 1992* was introduced to target 'serious repeat offenders' and 'repeat violent offenders', only a handful of 'hard core' offenders¹⁶ have been incapacitated (Broadhurst and Loh 1993). One problem identified was the uncertainty over the definition of 'conviction appearance' specified by the Act. The controversy over the Act might also have 'produced some tentativeness or reluctance among key players in the criminal justice system and acted to depress enthusiasm for prosecution under the Act' (Broadhurst and Loh 1993, p.258; see also Harding 1993). In many ways, the symbolic power of the Act as demonstrating the 'toughness' of the government on juvenile offenders seemed more important than its actual effectiveness.

4. CONCLUSION: THE LIMITS OF INCAPACITATION

The research evidence examined in this bulletin suggests that estimates of the impact of collective incapacitation vary considerably from one study to another and depending on the severity of the policy. However, even a modest reduction in crime involves paying a heavy price in terms of increases in prison population: a ten per cent decrease in crime typically requires a doubling of the prison population. Selective incapacitation promises a better trade-off by targeting offenders who have high rates of offending. Such policies, however, punish offenders on the basis of prediction, an exercise heavily criticised both on technical and ethical grounds. The attractions of such policies are considerably diluted when the crime-reduction benefits were found to be much more modest than initially claimed and the rate of 'false positives' unacceptably high.

In conclusion, it is important to point out that the models used to evaluate the effectiveness of incapacitation are based on a number of assumptions, which may in fact be false. For example, the

assumption that offenders sentenced to imprisonment are not replaced by other offenders may not hold for activities such as drug trafficking or property crime where a market for the illegal substance or stolen goods exists. The assumption that individual offending rates are stable over their 'criminal careers' has also been challenged by some research findings. Any violation of these assumptions would lead to a lower estimate of the incapacitative effect of imprisonment.

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NOTES

- 1 The cost per inmate per day for 1993/94 was \$139 for maximum security, \$123 for medium security, and \$94 for minimum security prisoners.
- 2 Details of the derivation of this formula are found in Blumstein et al. (1986, pp.144-46).
- 3 'Arrests' here refer to 'all offences attributed to the juvenile by the police without formal arrest charges against the juvenile' (Cohen 1983, p.13).
- 4 Index offences as defined by the FBI include homicide, rape, robbery, aggravated assault, burglary, larceny and auto theft.
- 5 In a stable prison population (i.e. one where the mean arrival rates and lengths of stay are constant) the prison population is equal to the product of the average length of stay (in years) and the number of prisoner receptions (per year).
- 6 The 18 month sentence took into account that most prisoners received a remission of one-third of their sentence. Hence the net sentence length was one year.
- 7 If *I* were higher in value, the required increase in prison population would be lower, and vice versa.
- 8 This excludes federal prisoners, inmates in local jails and prisoners sentenced to prison for one year or less. In some States, prisoners were detained in jails to relieve overcrowding in State prisons. These additional prisoners, if known, were added to the data.
- 9 The 90th percentile refers to the rate at or above which the top offending' ten per cent of the respondents committed a particular offence.
- 10 A regression model using age and self-reported information about juvenile offending, commitments to juvenile institutions, drug use, marital and employment status, etc., explained 35 per cent of the variance in annual offending rates. However, many inmates were misclassified as high-rate robbers using this model (Visher 1986, p.168).
- 11 Among those classified as high-rate offenders, 60 per cent of the robbers in California, 66 per cent of the burglars in Michigan and 39 per cent of the burglars in Texas were actually low- or medium-rate offenders.
- 12 Cohen (1983, p.47) has commented on the problem of shrinkage in prediction models: 'No matter how well a prediction device performs on the construction sample, there will be some shrinkage in predictive accuracy when that scale is applied to new independent samples. The greater the differences between the construction and validation samples, the greater the shrinkage. Shrinkage is thus likely to be especially severe in going from inmates to a sample composed of convicted offenders.'

- 13 Zimring and Hawkins (1995, pp.50-51) made a similar point: 'When existing criminal justice policies incarcerate a substantial fraction of a population of offenders, the expected returns from further incarceration may be inversely proportional to the efficiency of the current system in selecting high-risk cases for imprisonment. The more effectively the existing system operates, the less the prevention per additional unit of imprisonment can be expected.'
- 14 The law required the imposition of a two-year mandatory sentence on any defendant who possessed a firearm in a felony offence. The mandatory sentence was to be imposed in addition to the sentence for the primary felony offence.
- 15 The Bartley-Fox Amendment required the imposition of a one-year mandatory minimum sentence on offenders convicted of carrying an unlicensed firearm.
- 16 By July 1993, only two offenders with the required number of previous 'conviction appearances' had been sentenced under the Act (Broadhurst and Loh 1993, p.168).

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