

NATIONAL CENTER FOR STATE COURTS
Court Services Division

**ASSESSMENT OF PWS SYSTEM EFFECTS ON THE
RANDOM SELECTION OF JURORS AND THE
DEMOGRAPHIC CHARACTERISTICS OF THE JURY
POOL IN THE SUPERIOR COURT OF ARIZONA,
MARICOPA COUNTY**

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I. INTRODUCTION

In July 2006, the Superior Court of Arizona, Maricopa County (Superior Court), contracted with the National Center for State Courts (NCSC) to review its jury management system. The Superior Court specifically requested that the NCSC Center for Jury Studies determine whether its Proximity Weighted Summoning (PWS) System randomly selects jurors from the master jury list for the county; whether the PWS System systematically excludes any identifiable group or population; and the effect of the PWS System on the demographic characteristics of jurors reporting at the various courthouse facilities in Maricopa County. The Superior Court also requested that the NCSC describe how other courts around the country summons jurors to multiple locations within a jurisdiction.

The impetus for this request resulted from a series of jury challenges alleging that the PWS System fails to comply with Arizona law requiring that jurors be randomly selected from the master jury list for the county and that the PWS System produces jury pools in the various court locations that do not reflect a fair cross section of the community. G. Thomas Munsterman and Paula Hannaford-Agor of the NCSC Center for Jury Studies visited the Superior Court on August 21-22 to obtain operational information about the PWS System, supporting data from the jury management system, and the Biographical Forms completed by jurors who reported for service in the Superior Court from September 2005 through August 2006. This report summarizes the findings from this assessment.

II. SUMMONING FOR MULTIPLE LOCATIONS

How courts select names of persons to serve when there are several court locations within a jurisdiction is an uncharted field in practice and jurisprudence. The only known discussion of this topic is in a book written by the authors of this report.¹ The decision about how to summons jurors to multiple locations within the jurisdiction depends on a number of factors including the actual location of the courthouses to which jurors will be summonsed, the number of jurors needed at each location based on the volume and types of cases to be tried, and the relative ease or difficulty jurors will experience in traveling to those locations. As a practical matter, courts have a great deal of discretion in how each of these factors should be taken into account when determining jury summoning procedures.

Certainly the first, and most far-reaching factor, is a court's decision to build additional courthouses to better serve its resident population. The primary purpose for decentralizing a jurisdiction is to provide its citizens with improved "access to justice." Precisely where to locate new courthouses, and which geographic areas of the jurisdiction these new courthouses are intended to serve, are decisions that involve the greatest degree

¹ G. THOMAS MUNSTERMAN & PAULA L. HANNAFORD-AGOR, THE PROMISE AND CHALLENGES OF JURY SYSTEM TECHNOLOGY 24-26 (NCSC 2003).

of discretion.² In making these decisions, courts generally consider the convenience of litigants, lawyers, witnesses, and the public including prospective jurors.³ Specific issues related to jury operations, such as equal probability of selection and representation, generally fall low on the list of priorities, however.

Table 1 illustrates the range of discretion exercised by U.S. courts in how jurors' names are selected and allocated to a courthouse when a jurisdiction has more than one location for conducting jury trials. The first model reflects the default position – that is, courts that have only a single location for jury trials or that summons jurors randomly from the entire jurisdiction for all locations. No discretion as to juror allocation is exercised for this model. Theoretically, all names on the master jury list have an equal probability of selection and the demographic make-up of the jury pool is generally uniform at all locations.

For the second and third models presented in Table 1, the primary area of discretionary decision-making involves establishing the geographic boundaries from which jurors will be summoned for each location. Sometimes this decision rests simply on geography or, more precisely, topology. The Superior Court in El Dorado County, California, has several courthouses located near Placerville, the county seat, as well as one located in South Lake Tahoe. A mountain range separates Placerville on the western slope from South Lake Tahoe on the eastern slope. Jurors are drawn from either side of the mountains to report to their local courthouses.

Some superior courts in California have multiple courthouses, many of which were formerly municipal courts before the state unified its court system in 2000 and converted its municipal courts to superior courts.⁴ In some counties, such as San Diego, the courts draw jurors on a countywide basis for the “main courthouse” but draw from the former municipal court boundaries for other locations. This arrangement is permissible by California statute provided that “all qualified persons in the country [have] an equal opportunity to be considered for jury service.”⁵ In Cook County, Illinois, the downtown Chicago courts draw countywide while other courts draw from north or south of Roosevelt Road.

² Often these decisions are made by representatives of both the state and local court system and non-court agencies and are driven as much by the needs and resources of non-court agencies (e.g., access to government-owned property, public safety, traffic patterns, etc.) as by court needs and resources.

³ ROBERT W. TOBIN, *CREATING THE JUDICIAL BRANCH: THE UNFINISHED REFORM 237* (NCSC 1999).

⁴ CAL. GOV'T CODE §§ 70200-70219 (West 2006).

⁵ CAL. CIV. PROC. § 198.5 (West 2006) (“If sessions of the superior court are held in a location other than the county seat, the names for master jury lists and qualified jury lists to serve in a session may be selected from the area in which the session is held, pursuant to a local superior court rule that divides the county in a manner that provides all qualified persons in the county an equal opportunity to be considered for jury service. Nothing in this section precludes the court, in its discretion, from ordering a countywide venire in the interest of justice.”).

Table 1: Key Decisional Factors in Jury Summoning to Multiple Locations				
	Random across jurisdiction	Hardline geographic demarcation	Countywide and hardline geographic demarcation	Proximity Weighted System
Examples	Most jurisdictions (all single location jurisdictions)	San Bernadino and El Dorado Counties; federal district courts	San Diego and Orange Counties, CA; Cook County, IL	Los Angeles County, CA; Maricopa County, AZ
Authority	Legal default	Jurisdiction Jury Plan adopted by Court Rule or Administrative Order; local practice (unchallenged)		Presiding Judge
Discretion in juror allocation	None	Selection of geographic demarcation lines		Assignment of zip code to zone; estimate of anticipated need per location; percentage matrix determination
Demographic Representation of Jury Pool	Basically uniform, contingent on percent reporting	Essentially separate jurisdictions	Separate or equal jurisdictions	Blends cross-section across locations
Randomness (Equal probability of Selection)	Same probability for all persons on the master jury list	Depends if hardline geographic demarcation matches court demands		Equal probability if anticipated needs are close to actual needs
Susceptibility to non-randomness	No	Yes		Yes, but very slight
Level of Citizen Inconvenience	Most inconvenience	Least inconvenience, some relief	Some relief	Minimizes level of inconvenience

Federal district courts provide another example of the discretion of a court in establishing the jurisdiction of the sub-locations. The U.S. Code defines the jurisdictions of the federal district courts.⁶ For some states the jurisdiction is established, but the sub-districts, known as Divisions, may or may not be defined by the Code. Some sections simply give the places of holding court. For example, Section 82 states that “Arizona constitutes one judicial district. Court shall be held at Globe, Phoenix, Prescott and Tucson.” The US District Court of Arizona then defines the divisions and the counties they encompass through its local rules of civil procedure.⁷

⁶ 28 U.S.C. §§ 81-144 (2006).

⁷ L. R. CIV. PROC. 77.1 (D. Ariz. 2005-2006) (“The District covers the entire State of Arizona. However, for convenience the District is divided into three unofficial divisions, each named and comprising counties as follows ...”). The rule then provides the counties in each division.

The federal statute is explicit that the most important issue with respect to divisions within the federal District Court is convenience, not equal probability of jury selection or concerns for the cross-section of the jury pool in each division. In fact, unless the jury trial caseloads in the three divisions match the jury eligible populations in the three divisions, the probability of selection of a citizen as a juror will be different in each division. This probability will also differ based on the ability of the courts to bring in only the number of prospective jurors needed to select a jury. These differences are subtle and usually are ignored, however these are factors in terms of equal probability of selection in Maricopa County, as we discuss in Section V.

In a hardline defined system, differences in the probability of persons being selected for jury service are very likely to occur due to the differences in the needs of the court locations for jurors. It is also very likely that the cross section of those serving will be different because the “community boundaries” are redefined. When there are several courts in a county and some draw county wide and others draw from less than the county, these same differences can occur.⁸

An alternative to the ‘hardline boundaries’ in the examples above are the methods used in Los Angeles County, California and in Maricopa County. The Superior Court of Los Angeles County holds jury trials in 34 locations. Dividing Los Angeles County into 34 sub-jurisdictions would be extremely difficult given the location of the courts across the county. To solve the problem, the court developed a system that gives each person in the county an equal probability of selection but assigns prospective jurors to a court that is closest to their residence consistent with the needs of each court for jurors. That is, a person can be asked to report to one of several courts based on the random assignment process and the estimated needs of the courts. This method is called the “bullseye method,” named after the graphical display which shows a circle around each court location. The radius of the circle is proportional to the needs of each court location.⁹ Los Angeles also restricts the maximum distance that a person can be asked to travel for jury service to 20 miles. This places a limit on the radius of these many intersecting circles. Because of these restrictions, some people in Los Angeles County can serve in many locations and others can serve in only one location. However, everyone can serve as a juror in some court location.

With the incredible diversity and the enclaves of racial and ethnic populations within Los Angeles County, the persons reporting at any of the 34 locations can hardly be expected to demographically reflect the entire county. The California Government Code, paragraph 69640 provides: “The Superior Court in Los Angeles County may by local rule establish superior court districts within which one or more sessions of the court shall be held.” The Superior Court established 11 judicial districts. The applicable region for demographic purposes was addressed in *Williams v. Superior Court of Los Angeles County*, in which the California Supreme Court said “[t]he

⁸ The sequence in which the names are drawn for the various courts can also produce unintended results. For example, if precautions are not taken, some areas can be completely excluded.

⁹ The National Center has worked with the Los Angeles Courts on this selection methodology. On a typical day approximately 10,000 people report for jury duty in Los Angeles County, which illustrates the enormity of the system.

appropriate definition of “community” for cross-section analysis is the judicial district in which the case is tried, not the county as a whole.”¹⁰

The Proximity Weighted Summoning (PWS) System developed in Maricopa County is described in detail in Section III of this report and is similar in concept to the Los Angeles system. Names are randomly drawn from the entire county population and the majority of jurors summonsed to each location reside closest to that location, although some may be assigned to more distant courts if the needs of those courts for jurors so demand. There is no mileage limit as in Los Angeles.

In addition to the discretion of establishing the sub-jurisdictions, there are two additional areas of discretion in the Maricopa and Los Angeles juror allocation system. The second is the determination of the closest court location. In Maricopa County, each zip code is classified into one of four zones. The zip codes classified as Zone 1 are those closest in proximity to the Downtown courthouse. Those for Zones 2, 3, and 4 are closest to the Southeast, Northwest, and Northeast courthouses, respectively. Some zip codes are approximately equidistant to two or more courthouse locations. In other instances, a zip code may be closest to one location as measured by a straight line, but transportation factors may indicate that the commute from that zip code would actually be shorter to a more distant courthouse. In either case, the Office of the Jury Commissioner exercises its discretion as to the zone classification. The Superior Court in Los Angeles County has somewhat less discretion in this regard. There each census block is classified as to the locations to which jurors from that block can be assigned, using a straight line distance as the standard. Permissible court locations are ranked from closest to furthest, subject to the 20-mile rule.

The third area of discretion is in the estimation of the need for jurors at each court location. This is done twice a year in Maricopa and is used in the random selection of names for each location. The estimate is based on past use of jurors and can include any other factors which might affect this estimate. This last area of discretion is the most dynamic and once established is in effect until the next projection is made. The impact of this last area can be illustrated with a scenario in which one court location, due to some unforeseen circumstance, no longer holds jury trials. Persons allocated to that courthouse and those already summonsed would be cancelled and would therefore have a lower probability of selection. They could be asked to report to another courthouse or be re-summonsed, but for a limited period of time the probability of selection would be different for each zone.

In addition to randomness, cross-section, and discretion, Table 1 describes the impact of each model on the level of convenience (or inconvenience) for jurors, which is not known to have been explicitly treated in case law or statutes. Nevertheless, it is an underlying factor in court decentralization and is implicitly referenced as a potential barrier to full participation in jury service in the ABA Principles for Juries and Jury Trials.¹¹ The PWS System developed by the Superior Court in Maricopa County was

¹⁰ 781 P.2d 537 (Cal. 1989).

¹¹ Principle 2 states “Citizens have the right to participate in jury service and their service should be facilitated.”

intended to bring juror convenience into the equation with randomness, cross-section, and discretion.

III. PROXIMITY WEIGHTED SUMMONING (PWS) SYSTEM

The system used in Maricopa County to select names of persons to be summoned for jury service is called Proximity Weighted Summoning. This system was developed in Maricopa County and is similar in many respects to the Los Angeles County jury system. To the best knowledge of the authors, however, the PWS System is not used in any other U.S. court. The reason for this uniqueness is that so few other courts face the multi-location issue discussed in Section II. The PWS System has been described in several documents.¹² In this section we summarize the key points and examine more closely those elements that are unique and critical to this process.

The master jury list contains the names of persons from the list of registered voters and the list of licensed drivers and state identification card holders. The master jury list is renewed annually by ACS, the Maricopa County jury management software vendor. Names are randomly drawn from the master jury list for service in the various court locations in Maricopa County.¹³ Names are drawn for the Superior Court subject to a set of percentages or weights which are determined by the Office of Jury Commissioner. These percentages are the crucial and unique step in the PWS System. The percentages used in the period from September 2005 to August 2006 are provided in Table 2.¹⁴

	Downtown	SE	NW	NE
Zone 1	50.01%	3.95%	6.00%	11.00%
Zone 2	19.35%	88.74%	3.00%	3.00%
Zone 3	19.35%	3.65%	87.35%	3.00%
Zone 4	11.29%	3.66%	3.65%	83.00%

¹² These documents include:

1. Bob James, Director of Jury Management, Judicial Branch of Arizona in Maricopa County, Statement Regarding Proximity Weighted Summoning (May 26, 2006).
2. John Barrett, Judicial Branch Chief Technology Officer, Jury Information (July 31, 2006)
3. ACS Government Systems, Data_Merge_Maricopa.doc (Aug. 17, 2006)
4. Letter to Deborah E. Johnson from Charles P. Byers, Director, Juror Solutions, Re: Affiliated Computer Services (ACS) Juror Management System Random Juror Selection and Verification (Aug. 8, 2006).

¹³ The Office of the Jury Commissioner is responsible for summoning jurors for the grand jury and for several of the municipal and justice-of-the-peace courts in addition to the Superior Court.

¹⁴ Bob James, Director of Jury Management, Judicial Branch of Arizona in Maricopa County, Statement Regarding Proximity Weighted Summoning (May 26, 2006).

Each column reflects the desired geographic composition of the jurors summonsed for each location. For example, Zone 1 contributes 50.01% of the jurors summonsed to the Downtown location, Zone 2 contributes 19.35% percent, and so on. Each column must total 100%.

The percent of persons summonsed to the courthouse nearest their home for each location – which might be considered the “convenience factor” – is shown in the diagonal percentages. This convenience factor is approximately 50% at the Downtown location and is over 80% in the other locations. The substantially lower convenience factor for Zone 1 results from the greater demand for jurors in Zone 1 as compared to its available population. Except for the Downtown location, the vast majority of jurors summonsed to the other locations are generally from “the neighborhood.”

If the PWS System was not in effect, the geographic composition of the jurors summonsed would be identical for each location. It would simply reflect the proportion of the adult population living in each zone. See Table 3. The degree to which the values in Table 3 differ from those in Table 2 gives a sense of the impact of the PWS System. For example, under the PWS System, only 17% the jury pool for the NE courthouse must travel from a more distant courthouse compared to 89% that would have to if the PWS System were not in place.

	Downtown	SE	NW	NE
Zone 1	37.3%	37.3%	37.3%	37.3%
Zone 2	32.0%	32.0%	32.0%	32.0%
Zone 3	20.2%	20.2%	20.2%	20.2%
Zone 4	10.5%	10.5%	10.5%	10.5%

The percentages in the PWS System matrix in Table 2 are not exclusive answers derived from a set of mathematical equations. Rather, they reflect one combination of percentages out of many possible combinations that, in the judgment of the Office of the Jury Commissioner, best satisfies the needs of the courts for jurors subject to three preexisting constraints. These constraints are that:

1. Any summoning system must allow for all persons on the Master Jury List (residents of Maricopa County 18 years or older) to be randomly summonsed for jury service to ANY Superior Court facility;
2. Any summoning system must allow for all persons on the Master Jury List to have the same probability of being randomly summonsed to jury service for Superior Court, regardless of the location of their residence; and
3. The ethnic representation of jurors appearing for service at all Superior Court locations must accurately reflect the ethnic representation of persons eligible for jury service residing in Maricopa County (18 years or older, United States citizen,

not convicted felon whose civil rights have not been restored, and not currently adjudicated as mentally incompetent or insane).¹⁵

The first constraint prohibits any of the percentages in the PWS System matrix from being equal to zero.

The second constraint requires that each prospective juror have the same chance of being selected over time, even though he or she may have a greater chance of being sent to the closest courthouse than to a more distant courthouse. A preliminary analysis of the allocation of prospective jurors to each location based on the PWS System matrix, however, quickly reveals some differential in the summoning rates across zones. Table 4 illustrates how the existing PWS System matrix would result in slightly unequal summoning rates across zones if, hypothetically, 500,000 citizens were summonsed for jury service given the existing demand for jurors in the four locations. The percentages in the far right-hand column are the total number of jurors that would be summonsed from each zone expressed as a percentage of the total number of records assigned to those zones on the master jury list.

Table 4: Hypothetical Allocation of 500,000* Jurors Based on PWS System Matrix						
	Downtown	SE	NW	NE	Total	
Existing Caseload Distribution	63%	20%	5%	11%	100%	
Jurors summonsed from ...						% of Master Jury List
Zone 1	158,300	4,042	1,549	6,084	169,975	22.3%
Zone 2	61,250	90,806	775	1,659	154,490	17.7%
Zone 3	61,250	3,735	22,556	1,659	89,200	20.7%
Zone 4	35,737	3,745	943	45,909	86,334	18.6%
Total	316,537	102,328	25,823	55,311	499,999	

* Total does not sum to 500,000 due to rounding.

This table illustrates a key feature of the PWS System – namely, that the ability to allocate jurors to multiple courthouses while simultaneously balancing the demographic profile of the jury pool and minimizing the inconvenience imposed on citizens necessarily requires some degree of flexibility in the summoning rate between zones. In Section V, we found a slight variation in summoning rates consistent with that expected from the PWS System matrix in the allocation of jurors to courthouse locations from September 2005 to August 2006. This raises the new and interesting question of how “equal” must equal probability of selection be?

Table 4a also highlights the sensitivity of the PWS System matrix to slight variations in the demand for jurors at each location. Table 4 showed the summoning effects based on the projected juror demand at the time the PWS System matrix was

¹⁵ Bob James, Director of Jury Management, Judicial Branch of Arizona in Maricopa County, Statement Regarding Proximity Weighted Summoning (May 26, 2006).

developed for the opening of the NE courthouse. This table shows how those summoning rates would change if the actual juror demand differed from the projected juror demand.¹⁶

Table 4a: Effect of Alternative Caseload Distributions to Allocation of 500,000* Jurors						
	Downtown	SE	NW	NE	Total	
Alternative Caseload Distribution 1	61%	18%	8%	13%	100%	
Jurors summonsed from ...						% of Master Jury List
Zone 1	152,531	3,555	2,400	7,150	165,636	21.8%
Zone 2	59,018	79,866	1,200	1,950	142,034	16.3%
Zone 3	59,018	3,285	34,940	1,950	99,193	23.0%
Zone 4	34,435	3,294	1,460	53,950	93,139	20.1%
Total	305,002	90,000	40,000	65,000	500,002	
	Downtown	SE	NW	NE	Total	
Alternative Caseload Distribution 2	65%	22%	4%	9%	100%	
Jurors summonsed from ...						% of Master Jury List
Zone 1	162,533	4,345	1,200	4,950	173,028	22.7%
Zone 2	62,888	97,614	600	1,350	162,452	18.6%
Zone 3	62,888	4,015	17,470	1,350	85,723	19.9%
Zone 4	36,693	4,026	730	37,350	78,799	17.0%
Total	325,002	110,000	20,000	45,000	500,002	
	Downtown	SE	NW	NE	Total	
Alternative Caseload Distribution 3	63%	20%	12%	5%	100%	
Jurors summonsed from ...						% of Master Jury List
Zone 1	157,532	3,950	3,600	2,750	167,832	22.1%
Zone 2	60,953	88,740	1,800	750	152,243	17.4%
Zone 3	60,953	3,650	52,410	750	117,763	27.3%
Zone 4	35,564	3,660	2,190	20,750	62,164	13.4%
Total	315,002	100,000	60,000	25,000	500,002	
* Total does not sum to 500,000 due to rounding.						

¹⁶ Juror demand among multiple locations can change quite easily. For example, a change in judicial assignments that increases the number of judges conducting jury trials in a location would necessarily increase the demand for jurors at that location. Conversely, the transfer of judges to non-jury trial calendars at a location would decrease the demand for jurors at that location.

The third constraint imposes the most ambitious requirement of the three. We would expect the jury pool at each location to reflect the demographic composition of its zone if the demarcation of zones followed the usual hardline approach described in Section II. Given the high convenience factors in the PWS System matrix, we would also expect the demographic composition of the jury pool in the SE, NW and NE court locations to strongly reflect their demographic zones. To satisfy the third requirement for jury pools that mirror the countywide profile at each location, the Office of the Jury Commissioner developed a software tool similar in approach to that used by the authors of this report to predict the demographic profile of the jury pool at each location. The Office of the Jury Commissioner has the added discretion to adjust the PWS System matrix at any time if its review of demographic profiles for each location so warrant.

IV. DATA SOURCES AND METHODS

We collected data about the PWS System and its effects on the pool of available jurors at each court location from several different sources. Several analytical methods were also employed to conduct this assessment. One source of information was written documentation about the PWS System provided by the Office of the Jury Commissioner. This included the document entitled “Statement Regarding Proximity Weighted Summoning” dated May 26, 2006 as well as documentation prepared by the Court’s jury software vendor ACS about the procedures employed to compile the master jury list. Staff also met with Bob James, the Director of Jury Management, on August 21 and 22, 2006 to obtain clarification about the PWS System documentation and other relevant details of jury operations in the Maricopa County Superior Court.

During the visit we also obtained a number of electronic datasets for use in the assessment. Two of these datasets consisted of records extracted from the master jury lists from which jurors were summonsed during the period September 2005 to August 2006.¹⁷ These datasets included the identification number assigned to each record and the zip code and date-of-birth associated with each record. The Pre-March 2006 master jury list, which consisted of approximately 2.9 million records, was used to select jurors who were first summonsed to appear on April 27, 2005 through June 18, 2006. The Post-March 2006 master jury list consisted of approximately 3.1 million records and was used to select jurors who were first summonsed to appear on June 19, 2006 through the remainder of this assessment period. Analytically, we believed it important to conduct parallel analyses – one focused on jurors summonsed from the Pre-March 2006 dataset and one focused on jurors summonsed from the Post-March 2006 dataset to identify and control for any systematic differences that might occur as a result of changes in the master jury list that might otherwise be ascribed to the PWS System.

¹⁷ The master jury list is compiled annually from the list of registered voters and the list of licensed drivers. The Office of the Jury Commissioner obtains the lists from the Maricopa County Department of Elections and the Arizona Division of Motor Vehicles, respectively, and forwards them to the Court’s jury software vendor (ACS). ACS merges the lists, identifies and removes duplicate records and submits the compiled list to an NCOA vendor to update addresses. ACS then returns the cleaned master jury list to the Superior Court for use in summoning jurors.

A second dataset contained information about jurors summonsed to appear from October 2005 through August 2006. Each record included the record identification number as well as the assigned group and pool numbers, the location to which the juror was summonsed, the mailing address zip code for each record, the jury status for each record (e.g., undeliverable summons, disqualified, excused, qualified and available to serve, instructed to report), and the appearance date (if any) for each record. After removing duplicate records,¹⁸ this dataset consisted of 531,760 records, of which 375,740 were summonsed to PWS Superior Court locations.¹⁹

To monitor the demographic characteristics of the jury pool at each location, the Superior Court regularly reviews the biographical forms that jurors complete upon reporting for service. In addition to information used by judges and litigants during voir dire, these forms request jurors to identify their race/ethnic background. See Appendix A. To enable us to compare this information on a zip code-by-zip code basis, the forms completed by jurors who reported for service at the four PWS court locations from September 2005 to May 2006²⁰ were shipped to Business Keypunch of Virginia, a data entry firm in Richmond, Virginia, which entered selected fields from the forms into a dataset for analysis purposes. The resulting dataset consisted of 52,936 records²¹ and included the court location, the date of service, the juror's zip code, and the juror's responses to the question concerning racial/ethnic background.²² A complication in the use of this dataset was how the Superior Court collapsed race and ethnicity into a single question on the biographical forms during this period, while the US Census Bureau

¹⁸ We found that approximately 24% of the original dataset consisted of duplicate records – that is, records with identical juror identification numbers. From discussions with Deborah Johnson, Court Technology Services (CTS), and through subsequent analysis of the duplicate records, we found that more than two-thirds of the duplicate records (70%) occurred when jurors deferred to a new date or failed to appear for jury service on the summonsed date, in which case the jury automation system creates a new record with the same juror identification number but assigns a new group and pool number for the new reporting date. The remaining duplicate records had identical identification numbers, pool numbers, group numbers, summons dates, and reporting status. According to Deborah Johnson, staff are not sure of the origin of those remaining duplicate records without further analysis.

¹⁹ The remaining records were summonsed by the Superior Court for the municipal and justice-of-the-peace courts, for county or state grand jury, or for the Superior Court juvenile court location.

²⁰ Approximately 1.6% of the biographic forms indicated dates of service prior to September 2005, .6% indicated dates of service after May 2006 (including some dates that had not yet occurred at the time of this assessment), and .2% did not indicate a date of service. The forms may have been completed incorrectly by the jurors or entered into the dataset incorrectly. These records were not used in subsequent analyses.

²¹ All but 5 of the original forms shipped to Business Keypunch were entered in the dataset. The biographical forms that were not entered were forms introduced by the Superior Court in September 2006, which revised the demographic question by separating the categories for race and ethnicity according to US Census definition

²² Each race/ethnicity category was assigned a number (e.g., Black, non-Hispanic was coded as “1”, White, non-Hispanic as “2”, Hispanic as “3”, etc.). Jurors who indicated multiple choices for race/ethnicity were coded as “9” (multiple). All responses written in the field marked “Other” were entered as a text field in the dataset.

disaggregates race and ethnicity as separate concepts.²³ The Superior Court form also omitted a category for Hawaiian natives or Pacific Islanders.²⁴

We also downloaded demographic data from the 2000 Decennial Census and the 2005 American Community Survey from the US Census Bureau website.²⁵ The 2000 Decennial Census information included race and ethnic demographic information about the adult (age 18 and older) population of Maricopa County on a countywide and on a zip code-by-zip code basis. The 2005 American Community Survey is an annual survey that uses sampling methodology to provide reliable estimates to states and large, urban communities about population trends on key demographic, economic, housing, and social indicators between each decennial census.²⁶ Although it currently does not provide information on geographic boundaries smaller than a countywide level, the American Community Survey does provide reliable estimates about significant factors related to juror qualification including citizenship status for the adult population.²⁷ This information was a critical component of the NCSC methods used to model the demographic profiles for each location.

One minor complication in this analytical approach is that the US Census Bureau does not actually use US Postal Service (USPS) zip codes in its data analysis. Instead, it has developed a system of Zip Code Tabulation Areas (ZCTA), which approximates the geographic boundaries of the USPS zip codes. As a result, some USPS zip codes do not have an equivalent Census Bureau ZCTA, either because the zip code references non-residential mailing addresses (e.g., post office box locations, large commercial or government addresses) or because the resident population for that zip code is so small that the Census Bureau merged it with another ZCTA. In addition, the ZCTA codes used in the 2000 Census do not reflect more recent additions or modifications to the USPS zip code areas. Of the 188 USPS zip codes that the Superior Court uses in the PWS System to assign zones, the US Census Bureau has 119 ZCTA equivalents, which account for all but .8% of the records with valid Maricopa County zip codes on the Pre-March 2006 master jury list.

To determine whether the PWS System randomly selects citizens from the master jury list for Maricopa County, we undertook a detailed comparison of the proportion of residents living in each ZCTA according to the 2000 Decennial Census with the

²³ See Elizabeth M. Grieco & Rachel C. Cassidy, *Census 2000 Brief: Overview of Race and Hispanic Origin* (March 2001) (available at <http://www.census.gov/prod/2001pubs/c2kbr01-1.pdf>).

²⁴ The US Census Bureau estimates that .1% of the adult population of Maricopa County classifies itself as Hawaiian native or Pacific Islander.

²⁵ <https://www.census.gov>.

²⁶ The American Community Survey is an annual survey that samples 1 out of every 6 households in every county, American Indian and Alaska Native Area, Hawaiian Home Land, and Puerto Rico. Testing for the American Community Survey began in 1996 and the survey is intended to provide critical economic, social, housing, and demographic information to federal, state, and community policymakers every year instead of once in 10 years. It will replace the Census Bureau “long form” in the 2010 Decennial Census. AMERICAN COMMUNITY SURVEY: QUESTIONS AND ANSWERS (January 2005) (available at http://www.census.gov/acs/www/Sbasics/Congress_toolkit/Q&A.pdf).

²⁷ See Tables B05003(A)-(I).

proportion of names on the master jury list in the corresponding zip codes and the proportion of names selected for jury service in the PWS courts. We continued this approach for every stage of the jury selection process from the compilation of the master jury list to the appearance of summonsed jurors at each of the PWS locations to determine if the PWS System had a disproportionate impact on any identifiable groups or populations within Maricopa County.

To examine the impact of the PWS System on the demographic profile of the jury pool at each court location, we used information from the US Census Bureau about the demographic profile of each ZCTA to model the expected demographic profile of the jury pool for those locations at each stage of the summoning and qualification process. This approach introduces an analytical complication referred to by statisticians as an ecological inference problem. This methodological approach employs probability theory to make inferences about the likely demographic make-up of a given geographic region (ZCTA). However, the fact that the population of a given ZCTA is 50% Hispanic does not necessarily mean that 50% of the individuals from the corresponding zip code that qualify for jury service or that appear for jury service are likewise 50% Hispanic. For ZCTA populations with very small minority populations (e.g., less than 15%), ecological inference problems become even more acute because the probability that any given record in that ZCTA is a member of that minority population is correspondingly small. To verify the validity of this approach, we therefore compared the model estimations to the actual demographic profile at each location based on the responses to the juror biographical forms.

The resulting demographic profiles from this modeling process and from the Juror Biographic Forms were then used to calculate the absolute and comparative disparity for all race and ethnic categories to determine if they approach or exceed legally recognized levels.²⁸ Absolute disparity is the difference between the proportion of a cognizable group in the community and the corresponding proportion of that group in the jury pool. Comparative disparity measures the relative (comparative) level of under-representation given the proportion of the cognizable group in the community. The Arizona Supreme Court has indicated that an absolute disparity of 11% may, in appropriate cases, be sufficient to establish a *prima facie* violation of the fair cross section requirement.²⁹ In a later decision, the Arizona Court of Appeals opined that a comparative disparity well below 50% is unlikely to be sufficient to establish under-representation, especially if the absolute disparity is also small.³⁰

²⁸ In *Duren v. Missouri*, the US Supreme Court set out three steps necessary to support a challenge to the jury pool – namely, that the underrepresented population must be from a “cognizable” group, that the proportion of the cognizable group in the jury pool is not fair or reasonable in relation to the number of persons in the community, and that the under-representation is due to systematic exclusion. Absolute disparity and comparative disparity are two common methods of measuring the extent to which a cognizable group is under-represented or over-represented in the jury pool.

²⁹ *Arizona v. Gretzler*, 612 P.2d 1023, 1040 (Ariz. 1980).

³⁰ *Arizona v. Sanderson*, 898 P.2d 483, n.2 (Ariz. App. 1995).

V. FINDINGS

A. Random Selection in Summoning in the PWS System

To determine whether the PWS System randomly selects citizens from the master jury list for jury service in the Superior Court, we constructed two datasets – one for each of the master jury lists used to summons jurors during the period October 3, 2005 through August 11, 2006. As discussed previously, it is important to conduct separate analyses on jurors summonsed from each master jury list to identify and control for differences that might occur as a result of changes in the master jury list. Each dataset included the following information for each ZCTA: the zone assigned by the PWS System, the total adult population according to the 2000 Decennial Census; the number of records on the master jury list; the number of jurors summonsed to PWS locations for the Superior Court; the number of jurors qualified for jury service at PWS locations for the Superior Court; the number of jurors told to report and waived off at each PWS location; and the number of jurors who appeared for jury service at PWS locations.

The dataset for the Pre-March 2006 master jury list aggregated the 2.9 million records into 119 categories, one for each valid Maricopa County zip code with an equivalent ZCTA, and included the aggregated records for jurors originally summonsed from October 2005 through June 18, 2006 – roughly an 8.5 month period. Similarly, the dataset for the Post-March 2006 master jury list aggregated the 3.1 million records into 119 categories, again one for each valid Maricopa County zip code with an equivalent ZCTA, and included the aggregated records for jurors originally summonsed from June 19, 2006 through August 11, 2006 – roughly a two-month period.³¹ Combined, the two datasets reflect the jury summoning activity in the Superior Court for slightly less than the full year (10.5 months) during which the PWS System operated with four locations. These datasets do not include information about jurors who were originally summonsed for service prior to October 3, 2005, but who deferred their service until after October 3, 2005 or who were given a new service date after October 3, 2005 after failing to appear on the original service date.

Average (Mean) Summoning Rates by Zone

Using these datasets, we calculated the summoning rate – that is, the percentage of jurors summonsed from the applicable master jury list – for each ZCTA and aggregated these rates into their assigned PWS zones. Table 5 illustrates the average (mean) summoning rate for each ZCTA by PWS zone as well as the standard deviation and the minimum and maximum ZCTA summoning rates for each PWS zone.

³¹ The aggregated figures for each ZCTA in the Post-March 2006 dataset include 249 records of jurors who deferred their service date until after August 11, 2006 or who were given a new service date after August 11, 2006 after failing to appear on the original service. These records comprise only .2% of the records for this time period and do not affect the overall calculations.

Table 5: Mean Summoning Rate by Zone					
Pre-March 2006 Master Jury List					
Zone	# of ZCTA in Zone	Mean Summoning Rate	Standard Deviation	Minimum Rate	Maximum Rate
1	38	11.5%	1.0%	11.1%	11.8%
2	34	9.5%	1.0%	9.2%	10.0%
3	26	10.7%	1.7%	10.0%	11.4%
4	21	13.1%	0.9%	12.7%	13.5%
Total	119	11.1%	1.7%	10.7%	11.4%
Post-March 2006 Master Jury List					
Zone	# of ZCTA in Zone	Mean Summoning Rate	Standard Deviation	Minimum Rate	Maximum Rate
1	38	3.2%	0.4%	2.7%	4.7%
2	34	2.8%	3.7%	1.6%	23.4%
3	26	2.6%	0.4%	1.2%	3.0%
4	21	2.8%	0.2%	2.5%	3.0%
Total	119	2.9%	2.0%	1.2%	23.4%

Overall, 11.1% of the names on the Pre-March 2006 master jury list were selected for jury service at PWS locations in the Superior Court during the period from October 3, 2005 to June 18, 2006. There was some variation in the summoning rate by PWS Zone as a result of the summoning parameters established in the PWS System for that period. The actual variation in the summoning rate among PWS zones (3.6 percentage points) is less than that projected by the PWS System based on the original parameters (4.81 percentage points). Some variation within each PWS Zone also occurs as a result of the random selection process itself. In PWS Zone 3, for example, the summoning rates range from 10.0% to 11.4% across the 26 ZCTAs, the largest variation of the four PWS zones.

There is a similar pattern of variation among PWS zones and among ZCTAs within each PWS zone in the Post-March 2006 dataset. Overall, 2.9% of the names were selected from the master jury list in the period from June 19, 2006 through August 11, 2006. This rate varied from 2.6% in Zone 3 to 3.2% in Zone 1. The variation in ZCTA summoning rates, ranging from 1.6% to 23.4%, was greatest in Zone 2.

PWS Effects on the Proportion of Persons Summoned from Zip Code Equivalents at Each Stage of the Jury Selection Process

To further investigate whether the PWS System randomly selects names from the master jury list, we undertook a detailed analysis to determine if the proportion of the population in each ZCTA changes in a statistically measurable way from one stage of the jury summoning process to the next, which would suggest a systematic effect of the PWS System. We first calculated the proportion of the adult population that lives in each ZCTA according to the 2000 Decennial Census and then corresponding proportions for

each subsequent stage of the jury summoning process (e.g., master jury list, summonsed to PWS location, qualified to serve, told to report versus put on call, appeared for service). By calculating confidence intervals estimating the expected range of percentages for each ZCTA, we determined whether the actual percent for each ZCTA differed from the expected range and its relative direction. For the sake of brevity, these calculations – specifically, the indicators of statistically measurable differences in the population proportions for the summoning stage of the jury selection process – are collectively referred to as the “PWS Effects” for the remainder of this report.

Tables 6a through 6d present the results of these analyses at the 95% confidence levels for Zones 1 through 4, respectively. Each column indicates the proportion of the population in that zip code at each stage of the jury selection process as well as an indicator (1, 0, or -1) of whether the percentage differs in a statistically measurable way from the previous jury selection stage.³² The shaded areas indicate the zip codes the ZCTA percentages that differ significantly from the previous jury summoning stage. For example, the names on the Pre-March 2006 Master Jury List for ZCTA 85009 comprise only 1.0% of the total, which is significantly less than the corresponding proportion of the adult population (1.6%) of Maricopa County.

³² A value of zero (0) indicates no statistically measurable difference in population percentage from the previous stage of jury selection. A value of 1 or -1 indicates that the population percentage is statistically greater or less, respectively, than the previous stage of jury selection.

Table 6a: Probability that the ZCTA Proportion Differs from the Previous Stage of the PWS Jury Summing Process for Zone 1 at 95% Confidence (Pre-March 2006 Master Jury List)

Zip Code	Adult Population	Master Jury List Pre-March 2006	Summonsed to PWS Location	Qualified to Serve	Told to Report	Put On Call	Appeared
85003	0.3%	0.3% 0	0.3% 0	0.2% 0	0.3% 0	0.2% 0	0.3% 0
85004	0.2%	0.1% 0	0.2% 0	0.1% 0	0.2% 0	0.1% 0	0.2% 0
85006	0.9%	0.6% 0	0.6% 0	0.6% 0	0.7% 0	0.5% 0	0.4% 0
85007	0.5%	0.4% 0	0.4% 0	0.4% 0	0.5% 0	0.3% 0	0.3% 0
85008	1.7%	1.3% 0	1.3% 0	1.1% 0	1.4% 0	1.0% 0	1.0% 0
85009	1.6%	1.0% -1	1.0% 0	1.0% 0	1.2% 0	0.9% 0	0.6% -1
85012	0.2%	0.2% 0	0.3% 0	0.2% 0	0.3% 0	0.2% 0	0.4% 0
85013	0.7%	0.7% 0	0.7% 0	0.7% 0	0.9% 0	0.5% 0	1.0% 0
85014	1.0%	0.8% 0	0.8% 0	0.7% 0	1.0% 0	0.6% 0	0.9% 0
85015	1.3%	1.0% 0	1.0% 0	0.8% 0	1.1% 0	0.7% 0	1.0% 0
85016	1.3%	1.1% 0	1.1% 0	1.0% 0	1.3% 0	0.8% 0	1.4% 0
85017	1.2%	0.8% 0	0.8% 0	0.7% 0	0.9% 0	0.6% 0	0.7% 0
85018	1.3%	1.3% 0	1.3% 0	1.2% 0	1.6% 0	1.0% 0	1.8% 1
85019	0.7%	0.6% 0	0.6% 0	0.6% 0	0.8% 0	0.5% 0	0.5% 0
85020	1.2%	1.1% 0	1.1% 0	1.0% 0	1.4% 0	0.9% 0	1.4% 0
85021	1.3%	1.1% 0	1.1% 0	0.9% 0	1.2% 0	0.8% 0	1.3% 0
85022	1.5%	1.6% 0	1.6% 0	1.5% 0	2.0% 0	1.3% 0	2.2% 1
85029	1.5%	1.4% 0	1.4% 0	1.3% 0	1.7% 0	1.1% 0	1.6% 0
85031	0.8%	0.6% 0	0.7% 0	0.7% 0	0.8% 0	0.6% 0	0.5% 0
85033	1.5%	1.2% 0	1.3% 0	1.2% 0	1.6% 0	1.1% 0	1.0% 0
85034	0.2%	0.2% 0	0.2% 0	0.2% 0	0.2% 0	0.2% 0	0.1% 0
85035	1.2%	0.9% 0	0.9% 0	1.0% 0	1.2% 0	0.8% 0	0.6% 0
85037	0.9%	1.0% 0	1.0% 0	1.1% 0	1.4% 0	1.0% 0	1.1% 0
85040	1.8%	0.7% -1	0.7% 0	0.7% 0	0.9% 0	0.7% 0	0.5% 0
85041	0.9%	1.1% 0	1.3% 0	1.5% 0	1.9% 0	1.3% 0	1.3% 0
85043	0.3%	0.6% 0	0.6% 0	0.6% 0	0.8% 0	0.5% 0	0.6% 0
85048	1.0%	1.1% 0	1.2% 0	1.2% 0	1.6% 0	1.0% 0	1.9% 1
85051	1.3%	1.2% 0	1.2% 0	1.1% 0	1.5% 0	1.0% 0	1.4% 0
85251	1.4%	1.3% 0	1.3% 0	1.1% -1	1.4% 0	0.9% 0	1.4% 0
85257	1.0%	1.0% 0	1.0% 0	0.9% 0	1.2% 0	0.8% 0	1.1% 0
85301	1.8%	1.4% 0	1.5% 0	1.3% -1	1.6% 0	1.1% 0	1.3% 0
85302	1.2%	1.2% 0	1.3% 0	1.2% 0	1.7% 0	1.0% 0	1.8% 1
85303	0.6%	0.7% 0	0.8% 0	0.8% 0	1.1% 0	0.7% 0	0.9% 0
85304	0.8%	0.9% 0	1.0% 0	1.0% 0	1.3% 0	0.9% 0	1.4% 0
85305	0.2%	0.2% 0	0.3% 0	0.3% 0	0.4% 0	0.3% 0	0.4% 0
85329	0.1%	0.0% 0	0.0% 0	0.1% 0	0.1% 0	0.0% 0	0.0% 0
85339	0.2%	0.3% 0	0.4% 0	0.5% 0	0.6% 0	0.4% 0	0.6% 0
85353	0.2%	0.4% 0	0.5% 0	0.5% 0	0.7% 0	0.5% 0	0.6% 0

Table 6b: Probability that the ZCTA Proportion Differs from the Previous Stage of the PWS Jury Summoning Process for Zone 2 at 95% Confidence (Pre-March 2006 Master Jury List)

Zip Code	Adult Population	Master Jury List Pre-	Summoned to PWS	Qualified to Serve	Told to Report	Put On Call	Appeared
85044	1.3%	1.4% 0	1.2% 0	1.2% 0	1.1% 0	1.2% 0	1.3% 0
85045	0.1%	0.2% 0	0.2% 0	0.2% 0	0.2% 0	0.2% 0	0.3% 0
85201	1.6%	1.4% 0	1.0% -1	0.9% 0	0.7% 0	1.0% 0	0.8% 0
85202	1.4%	1.3% 0	1.0% -1	0.9% 0	0.8% 0	1.0% 0	0.9% 0
85203	1.1%	1.1% 0	0.9% 0	0.9% 0	0.8% 0	0.9% 0	0.9% 0
85204	1.9%	1.7% 0	1.4% -1	1.4% 0	1.2% 0	1.5% 0	1.2% 0
85205	1.4%	1.3% 0	1.1% 0	1.1% 0	1.0% 0	1.1% 0	1.1% 0
85206	1.1%	1.0% 0	0.9% 0	0.8% 0	0.7% 0	0.8% 0	0.8% 0
85207	0.8%	1.2% 0	1.1% 0	1.2% 0	1.1% 0	1.2% 0	1.2% 0
85208	1.4%	0.9% 0	0.8% 0	0.7% 0	0.6% 0	0.8% 0	0.7% 0
85210	1.2%	1.1% 0	0.8% -1	0.7% 0	0.7% 0	0.8% 0	0.7% 0
85212	0.3%	0.5% 0	0.4% 0	0.5% 0	0.4% 0	0.5% 0	0.5% 0
85213	1.0%	1.0% 0	0.8% 0	0.9% 0	0.8% 0	0.9% 0	0.9% 0
85215	0.6%	0.5% 0	0.5% 0	0.5% 0	0.4% 0	0.5% 0	0.5% 0
85219	0.9%	0.1% -1	0.1% 0	0.1% 0	0.0% 0	0.1% 0	0.0% 0
85220	1.1%	0.2% -1	0.2% 0	0.1% 0	0.1% 0	0.2% 0	0.1% 0
85224	1.4%	1.4% 0	1.3% 0	1.4% 0	1.2% 0	1.4% 0	1.4% 0
85225	2.0%	1.9% 0	1.8% 0	1.8% 0	1.7% 0	1.9% 0	1.7% 0
85226	1.2%	1.2% 0	1.2% 0	1.2% 0	1.2% 0	1.3% 0	1.5% 0
85233	1.1%	1.2% 0	1.1% 0	1.2% 0	1.2% 0	1.3% 0	1.4% 0
85234	1.1%	1.2% 0	1.1% 0	1.3% 0	1.2% 0	1.4% 0	1.3% 0
85236	0.2%	0.3% 0	0.3% 0	0.4% 0	0.4% 0	0.4% 0	0.4% 0
85242	0.4%	0.8% 0	0.8% 0	0.8% 0	0.7% 0	0.9% 0	0.6% 0
85248	1.2%	1.5% 0	1.4% 0	1.4% 0	1.4% 0	1.5% 0	1.8% 0
85249	0.3%	1.1% 1	1.1% 0	1.3% 0	1.3% 0	1.3% 0	1.6% 0
85250	0.6%	0.7% 0	0.5% 0	0.6% 0	0.5% 0	0.6% 0	0.6% 0
85256	0.1%	0.1% 0	0.1% 0	0.1% 0	0.1% 0	0.1% 0	0.1% 0
85264	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
85268	0.7%	0.8% 0	0.8% 0	0.8% 0	0.8% 0	0.8% 0	0.9% 0
85281	1.9%	1.7% 0	1.3% -1	1.0% -1	0.9% 0	1.0% 0	0.8% 0
85282	1.8%	1.8% 0	1.3% -1	1.3% 0	1.1% 0	1.3% 0	1.2% 0
85283	1.5%	1.5% 0	1.2% -1	1.2% 0	1.0% 0	1.2% 0	1.0% 0
85284	0.5%	0.6% 0	0.5% 0	0.6% 0	0.6% 0	0.6% 0	0.8% 0
85296	0.9%	1.3% 0	1.3% 0	1.5% 1	1.4% 0	1.6% 0	1.6% 0

Table 6c: Probability that the ZCTA Proportion Differs from the Previous Stage of the PWS Jury Summoning Process for Zone 3 at 95% Confidence (Pre-March 2006 Master Jury List)

Zip Code	Adult Population	Master Jury List Pre-	Summonsed to PWS	Qualified to Serve	Told to Report	Put On Call	Appeared
85306	0.9%	0.9% 0	0.8% 0	0.8% 0	0.7% 0	0.9% 0	0.7% 0
85307	0.3%	0.3% 0	0.2% 0	0.2% 0	0.2% 0	0.2% 0	0.2% 0
85308	2.0%	2.2% 0	2.2% 0	2.4% 0	2.1% 0	2.5% 0	2.3% 0
85309	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
85320	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
85322	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
85323	0.9%	1.5% 1	1.5% 0	1.7% 0	1.5% 0	1.8% 0	1.4% 0
85326	0.7%	0.6% 0	0.7% 0	0.8% 0	0.7% 0	0.9% 0	0.6% 0
85335	0.2%	0.7% 0	0.7% 0	0.8% 0	0.7% 0	0.9% 0	0.6% 0
85337	0.1%	0.1% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
85338	0.5%	1.2% 1	1.3% 0	1.5% 0	1.4% 0	1.5% 0	1.5% 0
85340	0.2%	0.6% 0	0.6% 0	0.7% 0	0.7% 0	0.8% 0	0.7% 0
85342	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
85345	1.6%	1.7% 0	1.7% 0	1.8% 0	1.5% 0	1.9% 0	1.5% 0
85351	1.3%	1.2% 0	1.1% 0	0.7% -1	0.6% 0	0.8% 0	0.8% 0
85354	0.1%	0.1% 0	0.1% 0	0.1% 0	0.1% 0	0.1% 0	0.1% 0
85355	0.1%	0.1% 0	0.1% 0	0.2% 0	0.1% 0	0.2% 0	0.2% 0
85361	0.1%	0.1% 0	0.1% 0	0.1% 0	0.1% 0	0.1% 0	0.1% 0
85363	0.1%	0.2% 0	0.2% 0	0.1% 0	0.1% 0	0.2% 0	0.1% 0
85373	0.5%	0.5% 0	0.5% 0	0.3% 0	0.3% 0	0.4% 0	0.3% 0
85374	1.0%	1.3% 0	1.3% 0	1.3% 0	1.1% 0	1.3% 0	1.2% 0
85375	1.2%	1.0% 0	1.0% 0	0.6% -1	0.5% 0	0.6% 0	0.6% 0
85379	0.0%	0.6% 0	0.6% 0	0.8% 0	0.7% 0	0.8% 0	0.8% 0
85381	0.7%	0.8% 0	0.9% 0	1.0% 0	0.8% 0	1.0% 0	0.9% 0
85382	1.2%	1.2% 0	1.2% 0	1.2% 0	1.1% 0	1.3% 0	1.2% 0
85390	0.3%	0.2% 0	0.2% 0	0.2% 0	0.1% 0	0.2% 0	0.2% 0

Table 6d: Probability that the ZCTA Proportion Differs from the Previous Stage of the PWS Jury Summoning Process for Zone 4 at 95% Confidence (Pre-March 2006 Master Jury List)

Zip Code	Adult Population	Master Jury List Pre-	Summoned to PWS	Qualified to Serve	Told to Report	Put On Call	Appeared				
85023	1.1%	1.0%	0	1.1%	0	0.9%	0	1.2%	0	0.8%	0
85024	0.6%	0.6%	0	0.7%	0	0.7%	0	0.6%	0	0.8%	0
85027	1.2%	1.2%	0	1.4%	0	1.4%	0	1.1%	0	1.5%	0
85028	0.7%	0.7%	0	0.9%	0	0.9%	0	0.8%	0	1.0%	0
85032	2.2%	2.0%	0	2.2%	0	2.2%	0	1.8%	0	2.4%	0
85050	0.6%	0.7%	0	0.8%	0	0.9%	0	0.7%	0	1.0%	0
85053	0.9%	1.0%	0	1.1%	0	1.1%	0	0.9%	0	1.2%	0
85054	0.1%	0.1%	0	0.1%	0	0.1%	0	0.1%	0	0.1%	0
85085	0.0%	0.3%	0	0.4%	0	0.5%	0	0.4%	0	0.5%	0
85086	0.3%	0.8%	0	1.0%	0	1.2%	0	0.9%	0	1.3%	0
85087	0.1%	0.1%	0	0.2%	0	0.2%	0	0.2%	0	0.2%	0
85253	0.6%	0.6%	0	0.8%	0	0.9%	0	0.7%	0	0.9%	0
85254	1.6%	1.7%	0	1.9%	1	2.0%	0	1.6%	0	2.2%	0
85255	0.7%	1.2%	0	1.4%	0	1.5%	0	1.2%	0	1.6%	0
85258	0.9%	0.9%	0	1.1%	0	1.0%	0	0.8%	0	1.1%	0
85259	0.8%	0.7%	0	0.9%	0	1.0%	0	0.7%	0	1.1%	0
85260	1.2%	1.3%	0	1.5%	0	1.5%	0	1.2%	0	1.7%	0
85262	0.4%	0.6%	0	0.8%	0	0.9%	0	0.7%	0	1.0%	0
85263	0.1%	0.1%	0	0.1%	0	0.1%	0	0.1%	0	0.1%	0
85310	0.7%	0.8%	0	0.9%	0	1.1%	0	0.9%	0	1.2%	0
85331	0.8%	0.8%	0	1.0%	0	1.1%	0	0.9%	0	1.3%	0

We found that the percentage of jurors summonsed to PWS locations differed from the corresponding percentage of the Pre-March 2006 Master Jury List in seven ZCTA areas. Six ZCTA percentages, all in Zone 2, were significantly less and one (in Zone 4) was significantly more than the corresponding master jury list percentage. This is consistent with the pattern observed in Table 5 and is likely the result of the PWS System parameters in place during this time period. Of particular importance, in only one instance (ZCTA 85281) do the effects of the disproportionately high and low summoning in these zip codes perpetuate into subsequent stages of the jury selection process. This suggests the absence of a widespread, systematic effect of the PWS System on jury summoning and qualification. In fact, as we discuss shortly, the shaded ZCTA areas do not correlate with key geographic (ZCTA population) and demographic (race and ethnicity) variables

A similar conclusion arises from the Post-March 2006 analyses.³³ Five of the ZCTA percentages for jurors summonsed to PWS locations differed significantly from the corresponding percentages on the master jury list, all from Zone 2. Four were significantly less, none of which carried over into the qualification stage. Only in ZCTA 85249, where the master jury list percentage was .7%, did the disproportionately high summoning percentage (1.1%) carry over to a disproportionately high qualification rate (1.2%).

³³ Tables corresponding to Tables 6a through 6d are not provided for the Post-March 2006 analyses, but are available from the authors on request.

Correlations of PWS Effects with Geographic and Demographic Variables

In addition to the effects of the PWS System summoning on each ZCTA, we also examined whether PWS System effects have any correlation with key geographic or demographic variables. Table 7 presents the results of these correlations expressed as “Pearson Correlation Coefficients,” which are statistical measures that range from -1 to 1 and reflect the extent to which two variables correlate or move together in the same or opposite direction.³⁴ The presence of an asterisk beside a variable indicates that the probability is greater than 99% that the correlation is not the result of random chance.

	Pearson Correlation Coefficient	
	Pre-March 2006	Post-March 2006
ZCTA Size	-0.155	-0.290 *
% White	0.072	0.061
% Black	-0.142	-0.051
% American Indian / Native Alaskan	-0.018	-0.013
% Asian	0.057	-0.252 *
% Hawaiian / Pacific Islander	-0.283 *	-0.064
% Other Race	0.019	-0.024
% Multiracial	-0.047	-0.137
% Hispanic	0.045	-0.025

* Correlation is significant at the .01 level (2-tail)

We found no correlation between PWS System effects and the ZCTA population for the Pre-March 2006, suggesting that the PWS System does not disproportionately select or avoid selecting citizens from more densely populated areas. Except for persons of Hawaiian/Pacific Islander descent, which comprise only .2% of the adult population in Maricopa County,³⁵ there was no correlation between PWS System effects and the proportion of various racial and ethnic subpopulations. It is important to recognize that

³⁴ A value of 1 would indicate that the variables are perfectly correlated – that is, as the value for one variable increases, the second variable increases at the same rate. In contrast, a value of -1 indicates that the variables are inversely correlated – as the value for one variable increases, the second variable decreases at the same rate. A value of 0 indicates that the two variables have no correlation whatsoever.

³⁵ The PWS effect observed for the Hawaiian/Pacific Islander subpopulation may also derive from the fact that the vast majority (79.4%) live in PWS Zones 1 and 2, rather than being more evenly dispersed as are the other race and ethnic populations. Because we know that the PWS summoning rate for Pre-March 2005 was slightly higher in Zone 4, there is a measurable inverse correlation between Hawaiian/Pacific Islander population and PWS System effects on summoning.

these correlations are based on inferences about the racial and ethnic make-up of each ZCTA, which may not be entirely accurate given the ecological inference problems associated with small minority populations discussed previously.

The Post-March 2006 analyses yielded similar results for most of the demographic variables, except the affected subpopulation was Asian rather than Hawaiian/Pacific Islander. Again, this correlation may not be entirely accurate insofar that ecological inference problems tend to complicate the interpretation of this statistic. The summoning rate from the Post-March 2006 master jury list was also disproportionately high for less populous ZCTA areas due to the combination of the concentration of more populous ZCTA areas in Zones 1 and 2 and the higher summoning rate from Zone 1 during the period June 19 through August 11, 2006. Moreover, the fact that the different subpopulations were affected during different summoning periods (Pre and Post-March 2006 master jury lists) also suggests that these correlations might have resulted from differing juror demands by the various PWS locations, rather than a direct PWS effect.

B. Effect of PWS System on the Demographic Profile of the Jury Pool

To investigate the effect of the PWS System on the demographic profile of the jury pool at each PWS location, we imported the demographic characteristics for each ZCTA from the 2000 Decennial Census into the Pre-March 2006 and Post-March 2006 Master Jury Lists and into the Summoned Jurors dataset. In essence, for each record in the datasets, we assigned a probability that the person was White, was Black, was Hispanic, etc. based on the ZCTA associated with that record. This permitted us to predict the average (mean) proportion of each race and ethnicity for each PWS location. We then compared the PWS location profiles at each stage of the summoning process with the countywide profile from the 2000 Decennial Census and with the master jury list profiles and computed the absolute and comparative disparity for each location. To verify the reliability of this approach, we then compared the actual demographic profiles of the jury pool at each PWS location based on the biographical forms completed by jurors.

Table 8 provides the results of this demographic modeling process. The left-hand margin of the table provides the demographic profile for Maricopa County according to the 2005 American Community Survey. The columns to the right present the projected demographic profile for each court location and for each stage of the jury summoning process. The top, right quadrants also present the projected demographic profile for the Pre-March 2006 and Post-March 2006 master jury lists. For comparability with the actual demographic profiles derived from the Juror Biographical Forms, Table 8 provides the profiles of the jury pool in each location for each subsequent jury selection stage. This is based on all the jurors summonsed under the PWS System, rather than separating them based on the master jury list from which they were summonsed.

Table 8: Demographic Models based on 2000 Decennial Census					
Maricopa County Adult Population 2005 American Community Survey		Master List			
		Pre-March 2006		Post-March 2006	
N	2,597,348	2,889,024		3,072,094	
% White	80.9%	81.9%		82.0%	
% Black	3.6%	3.0%		3.0%	
% Am Indian / Alaskan Native	1.6%	1.5%		1.6%	
% Asian	2.8%	2.2%		2.2%	
% Hawaiian / Pacific Islander	n/a	0.2%		0.2%	
% Other	9.6%	8.4%		8.4%	
% Multi	1.4%	2.0%		2.0%	
% Hispanic (adj for citizenship)	13.1%	12.3%		12.2%	
Maricopa County Adult Population 2005 American Community Survey		Summonsed PWS			
		Downtown	SE	NW	NE
N	2,597,348	221,288	65,352	18,243	48,223
% White	80.9%	79.4%	84.4%	85.1%	89.5%
% Black	3.6%	3.5%	2.4%	2.7%	1.9%
% Am Indian / Alaskan Native	1.6%	1.7%	1.6%	0.9%	0.9%
% Asian	2.8%	2.1%	2.6%	1.8%	1.9%
% Hawaiian / Pacific Islander	n/a	0.2%	0.2%	0.1%	0.1%
% Other	9.6%	9.9%	6.9%	7.6%	4.0%
% Multi	1.4%	2.1%	1.8%	1.7%	1.5%
% Hispanic (adj for citizenship)	13.1%	13.9%	10.7%	12.2%	6.9%
Maricopa County Adult Population 2005 American Community Survey		Qualified			
		Downtown	SE	NW	NE
N	2,597,348	143,603	43,677	12,523	33,119
% White	80.9%	79.2%	84.5%	84.5%	89.6%
% Black	3.6%	3.6%	2.4%	2.8%	1.9%
% Am Indian / Alaskan Native	1.6%	1.7%	1.6%	0.9%	0.1%
% Asian	2.8%	2.2%	2.6%	1.9%	1.9%
% Hawaiian / Pacific Islander	n/a	0.2%	0.1%	0.1%	0.1%
% Other	9.6%	10.0%	6.8%	8.0%	3.9%
% Multi	1.4%	2.1%	1.8%	1.7%	1.5%
% Hispanic (adj for citizenship)	13.1%	14.0%	10.5%	13.0%	6.9%

Table 8: Demographic Models based on 2000 Decennial Census (con't.)					
Maricopa County Adult Population 2005 American Community Survey		On Call			
		Downtown	SE	NW	NE
N	2,597,348	82,773	34,611	12,310	27,996
% White	80.9%	79.5%	84.4%	84.5%	89.7%
% Black	3.6%	3.5%	2.4%	2.8%	1.9%
% Am Indian / Alaskan Native	1.6%	1.7%	1.6%	0.9%	0.8%
% Asian	2.8%	2.1%	2.6%	1.9%	1.9%
% Hawaiian / Pacific Islander	n/a	0.2%	0.1%	0.1%	0.1%
% Other	9.6%	9.9%	6.9%	8.0%	3.8%
% Multi	1.4%	2.1%	1.8%	1.7%	1.5%
% Hispanic (adj for citizenship)	13.1%	13.9%	10.5%	12.9%	6.7%
Maricopa County Adult Population 2005 American Community Survey		Report			
		Downtown	SE	NW	NE
N	2,597,348	60,830	9,066	213	5,123
% White	80.9%	78.9%	84.8%	82.7%	88.7%
% Black	3.6%	3.6%	2.4%	3.0%	2.1%
% Am Indian / Alaskan Native	1.6%	7.8%	1.5%	1.1%	0.9%
% Asian	2.8%	2.2%	2.6%	1.7%	1.9%
% Hawaiian / Pacific Islander	n/a	0.2%	0.1%	0.1%	0.1%
% Other	9.6%	10.2%	6.7%	9.3%	4.4%
% Multi	1.4%	2.2%	1.8%	1.8%	1.6%
% Hispanic (adj for citizenship)	13.1%	14.1%	10.4%	15.0%	7.5%
Maricopa County Adult Population 2005 American Community Survey		Appeared			
		Downtown	SE	NW	NE
N	2,597,348	41,169	7,600	123	3,184
% White	80.9%	81.4%	85.2%	85.1%	90.2%
% Black	3.6%	3.2%	2.3%	2.6%	1.8%
% Am Indian / Alaskan Native	1.6%	1.6%	1.4%	1.0%	0.8%
% Asian	2.8%	2.2%	2.6%	1.7%	1.9%
% Hawaiian / Pacific Islander	n/a	0.2%	0.1%	0.1%	0.1%
% Other	9.6%	8.6%	6.4%	7.7%	3.5%
% Multi	1.4%	2.0%	1.8%	1.6%	1.4%
% Hispanic (adj for citizenship)	13.1%	12.6%	10.1%	13.1%	6.6%

Before discussing the results of Table 8, it is important to consider several methodological problems that complicate these analyses. First, recall from our previous discussion that the approach employed in calculating these estimates inherently involves

ecological inference problems. Although the 2000 Decennial Census reports that 38% of the adult population living in ZCTA 85003 was Hispanic, there is no guarantee that 38% of the records on the master jury list with that zip code represent Hispanic persons.³⁶

Recall also that until September 2006 the Superior Court categorized race and ethnicity differently than the US Census Bureau in three significant respects. The US Census Bureau separates race and ethnicity into different concepts, whereas the Court combined the two on the Juror Biographical Form. The US Census Bureau also identifies Hawaiian/Pacific Islander as a race, a category that was omitted by the Superior Court.

Most significantly, race and ethnic categories for the US Census Bureau are exhaustive; if the respondent to the Decennial Census fails to indicate race for one or more of the household members, the race is imputed based on the race of other household members, the relationship to the other household members, or the race indicated for the members of that household in the previous decennial census.³⁷ A similar protocol, which involves the use of Spanish surnames, is followed for missing information about Hispanic/Latino ethnicity.³⁸ Yet nearly one in five jurors (19%) in Maricopa County chose not to indicate their race or ethnicity, or responded with a non-race response (e.g., nationality) on the Juror Biographical Forms. See Table 8a. This can have a profound effect on how the demographic profile is characterized. If missing race information is considered, for example, the jury pool for all Superior Court locations combined is 73.9% White, but if it is disregarded, the White proportion of the jury pool is estimated at 91.0%.³⁹

A final complication in these analyses is the issue of how to adjust the Hispanic population percentage to reflect the fact that a significant portion (43.3%) of the Hispanic community in Maricopa County are non-citizens and therefore ineligible for jury service. The 2005 American Community Survey estimated that 23.1% of the adult population of Maricopa County was Hispanic, but discounting this figure to compensate for US citizenship results in an estimate that only 13.1% of the jury eligible population is Hispanic.⁴⁰

³⁶ In fact, as Table 8a illustrates, the “actual” percentage of jurors from ZCTA 85003 who reported being of Hispanic/Latino ancestry was 13.5%.

³⁷ US CENSUS BUREAU, Census Data Information, Subject Characteristic: Race (located at http://factfinder.census.gov/servlet/MetadataBrowserServlet?type=subject&id=PLRACE&dsspName=DEC_2000_PL&back=update&lang=en).

³⁸ Arthur R. Cresce, Audrey D. Schmidley & Roberto R. Ramirez, *Identification of Hispanic Ethnicity in Census 2000: Analysis of Data Quality for the Question on Hispanic Origin* (U.S. Census Bureau Working Paper 75) (located at <http://www.census.gov/population/www/documentation/twps0075/twps0075.pdf>).

³⁹ To categorize juror race and ethnicity as accurately as possible from the Juror Biographical Forms, we reviewed any comments written by jurors in the space marked “Other.” Of the 914 written comments, it was possible to infer a valid race or ethnicity for 483 records (52.8%). These inferred classifications are reflected in Table 8a.

⁴⁰ To further complicate this issue, the master jury list used for jury selection is derived from the list registered voters, for which US citizenship is required, and the list of licensed drivers, which does not require US citizenship. Because the list of licensed drivers is the larger of the two lists and is also designated as the primary list, we believed it appropriate to further adjust the projected Hispanic proportion of the jury pool to reflect the fact that one of the source lists already excludes non-citizens.

Table 8a: Actual Jury Pool Profile Compared to 2005 American Community Survey						
Maricopa County Adult Population 2005 American Community Survey		Actual Based on Juror Biographical Forms with Imputed Race/Ethnicity*				
		Total	Downtown	SE	NW	NE
N	2,597,348	52,936	41,056	7,881	294	3,705
% White	80.9%	73.9%	72.8%	78.9%	71.4%	76.0%
% Black	3.6%	3.1%	3.4%	2.0%	2.7%	1.9%
% Am Indian / Alaskan Native	1.6%	1.0%	1.1%	0.9%	0.0%	0.6%
% Asian	2.8%	2.2%	2.2%	2.2%	1.4%	1.8%
% Hawaiian / Pacific Islander	n/a	0.2%	0.2%	0.1%	0.7%	0.1%
% Other	9.6%	0.0%	0.0%	0.0%	0.0%	0.0%
% Multi	1.4%	0.8%	0.8%	0.9%	0.7%	0.6%
% Missing / Non-Race Response	n/a	18.8%	19.5%	14.9%	23.1%	19.0%
% Hispanic (adj for citizenship)	13.1%	11.6%	12.5%	8.9%	8.2%	7.1%

* Race / Ethnicity imputed from written comments, if available, for records with missing information.

Turning back to Table 8, it is clear that the projected demographic profiles of the jury pool at each location differ somewhat from each other and from the countywide profile. Although most of these differences are likely due to the summoning differential inherent in the PWS System, some difference in the location profiles would also be expected to occur as a result of differences in the reporting rates at each location, especially by jurors summonsed to more remote locations. Notwithstanding these differences, the absolute disparity does not exceed 10% for any of the race categories. The highest levels of absolute disparity – ranging from 8.6% to 9.3% – show that Whites are projected to be slightly over-represented in the NE courthouse, but the greatest comparative disparity for Whites at this location is projected to be 11.5%, well below the 50% threshold suggested by the *Sanderson* opinion.⁴¹

The models also project that Hispanics will be slightly over-represented in the Downtown courthouse (5.5 to 5.8% at various stages) and in the NW courthouse (7%) at the stage of being told to report. The corresponding comparative disparities at the Downtown location range from 42.2% to 44.5% over-represented. The only comparative disparity greater than 50% is projected to occur for Hispanics who are told to report to the NW courthouse (53.7%), but the actual projection for those that appear at this location is only 33.8%.

In most respects, the NCSC demographic models correspond fairly closely to the actual demographic profiles for each location based on the Juror Biographical Forms.

⁴¹ It should also be noted that the inferred demographic profile for the master jury lists has a slightly higher proportion of Whites and slightly lower proportions of all other races (except Hawaiian / Pacific Islander) and of Hispanics compared to the 2005 American Community Survey estimates. Because the master jury list is the operational starting point for the jury selection process, rather than the general community, this demographic profile is expected to perpetuate throughout subsequent stages of jury selection.

The two most significant differences across all Superior Court locations are the proportions White and Other jurors. The actual proportion of White jurors who report for service ranges from 6.4 to 14.5 percentage points less than that projected, depending on the location. The actual proportion of Other jurors is 6.3 and 9.2 percentage points higher than that projected for the NW and NE locations, respectively. Both of these differences most likely result from how the US Census Bureau and the Superior Court define race, especially the treatment of missing information, rather than from actual differences in the projected versus actual demographic profiles for each location.⁴²

VI. CONCLUSIONS

The PWS System developed by the Superior Court differs in several important respects from systems developed by other courts that have faced the question of how to summons jurors to multiple locations within a jurisdiction. Discretionary decision-making – in the location of courthouses in the jurisdiction, in defining the geographical boundaries to be served by those courthouses, in determining the volume and types of cases to be tried in those locations – is an inherent feature of these systems. The PWS System is unique in its attempt to balance several fundamental, but not necessarily mutually compatible, goals of jury management – namely, equal probability of selection for all eligible and available citizens, jury pools at each courthouse location that mirror the demographic characteristics of the entire county, and minimization of the inconvenience to citizens of serving in remote locations. It is an ambitious program and, from a purely qualitative standpoint, one that achieves these goals admirably well.

The review of jurors summonsed to the PWS locations indicates a very slight difference in the summoning rates across zones during the October 2005 to August 2006 period that can be attributed to the PWS System. For the Pre-March 2006 master jury list, the summoning rates ranged from 9.5% to 13.1% (3.6 percentage points). For the Post-March 2006 master jury list, the variation is .6 percentage points. In both instances, the variation is less than the expected variation of 4.8 percentage points projected by the PWS System matrix.

It is also clear from the comparison of summoning rates for the Pre-March and Post-March 2006 master jury lists that the PWS System does not consistently summons from the any one zone more heavily than the other zones. The shift from Zone 4 with the highest summoning rate for the Pre-March 2006 master jury list to Zone 1 with the highest rate for the Post-March 2006 master jury list is most likely the result of shifting demands for jurors at those locations.

This assessment also found that the PWS System does not systematically exclude any identifiable populations or groups from jury service. Citizens are summonsed from the vast majority of valid Maricopa County zip codes in proportion to their numbers on the master jury list and, for the handful of zip codes that were over-summonsed or under-summonsed, no discernible pattern can be found to suggest that the PWS System effects perpetuate into subsequent stages of the jury selection process.

⁴² Jurors could write their race or ethnicity in a space provided. Recall, for example, that the Superior Court did not provide “Other Race” as an option on the Juror Biographical Form.

Similarly, we found no correlation between the summoning effects of the PWS System and significant racial and ethnic populations in Maricopa County. The only statistically measurable correlations found in these analyses occurred in the Hawaiian/Pacific Islander and Asian subpopulations, which comprise .2% and 2.8%, respectively, of the adult population of Maricopa County. These correlations should be interpreted cautiously insofar that ecological inference problems may be operating, particularly with such small populations. Moreover, the fact that the different subpopulations were affected for different summoning periods suggests that these correlations may be the result of differing juror demands by the various PWS locations, rather than a direct PWS effect. The same conclusion can be drawn from the inconsistent correlation for population density from the Pre-March 2006 master jury list to the Post-March 2006 master jury list.

The demographic profiles of the jury pool differ slightly by location, but overall they closely mirror the demographic profile for Maricopa County. Across all of the locations, the most significant deviations from the countywide profile occur for Whites and for “Other” race. These deviations may not be as extensive as they appear, however, due to the large proportion of jurors (19%) who declined to indicate their race or ethnicity on the Juror Biographical Forms. Moreover, the deviations themselves are well within the parameters established in Arizona case law for absolute and comparative disparity.