

IN THE COMMONWEALTH COURT OF PENNSYLVANIA

League of Women Voters of Pennsylvania, *et al.*,

Petitioners,

v.

The Commonwealth of Pennsylvania, *et al.*,

Respondents.

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) Civ. No. 261 MD 2017

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PROPOSED ORDER

AND NOW this _____ day of December, 2017, upon consideration of Petitioners' Motion *in Limine* to Exclude Testimony from Dr. Wendy Tam Cho Regarding Petitioners' Expert Dr. Jowei Chen, and after having heard argument on said Motion, IT IS HEREBY ORDERED that Petitioners' Motion *in Limine* is DENIED.

The Honorable P. Kevin Brobson

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**LEGISLATIVE RESPONDENTS’ MEMORANDUM OF LAW IN
OPPOSITION TO MOTION *IN LIMINE* TO EXCLUDE
TESTIMONY FROM DR. WENDY TAM CHO
REGARDING PETITIONERS’ EXPERT
DR. JOWEI CHEN**

Respondents Michael C. Turzai and Joseph B. Scarnati III (collectively, “Legislative Respondents”) file this Memorandum of Law in Opposition to Petitioners’ Motion *in Limine* to Exclude Testimony from Dr. Wendy Tam Cho Regarding Petitioners’ Expert Dr. Jowei Chen (the “Motion”).

I. BACKGROUND

On November 27, 2017 Petitioners served Legislative Respondents with the expert report of Dr. Jowei Chen. One week later, Legislative Respondents produced the expert of Dr. Wendy Tam Cho. In her report, Dr. Cho leveraged her decades of experience studying redistricting and the use of computer simulations in redistricting to explain why Dr. Chen’s simulation approach is unreliable for purposes of assessing whether the congressional redistricting plan at issue in this matter (the “2011 Plan”) was the product of partisan gerrymandering.

In their Motion, Petitioners take exception to Dr. Cho’s report in two respects. First, they criticize her for not studying the exact source code Dr. Chen used to generate the simulations before offering her report. Second, they accuse her of criticizing Dr. Chen by using an “entirely different algorithm developed by an entirely different person.” Mem. Supp. Motion at 1. The first criticism is not a valid

basis to exclude expert testimony; the second criticism is simply inaccurate. Neither is a basis to exclude Dr. Cho's testimony for the following reasons.

As an initial matter, Dr. Cho explained that the problems inherent in Dr. Chen's simulated maps could be properly understood by a comparison to a narrower data set: "By just examining the set of maps that Chen produces, there is no way to tell if his sample is a representative set. To examine the properties of an algorithm like his, it is instructive to use a smaller data set for which we know the answer." Motion, Exhibit A, Cho Report at 19. To that end, Dr. Cho cited a 2017 working paper authored by Benjamin Fifield and others entitled "A New Automated Redistricting Simulator Using Markov Chain Monte Carlo" (the "Fifield Paper"), which analyzed "the very small redistricting problem of partitioning a data set that consists of 25 precincts (from the state of Florida) into 3 contiguous districts." Motion, Exhibit A, Cho Report at 19. Dr. Cho then ran a Monte Carlo simulation utilizing Fifield's data set. She used that simulation result to illustrate the point that if a Monte Carlo simulation is not reliable for drawing "random" maps in a small data set like Fifield's, the simulation technique is not reliable for use in a much more complex redistricting plan like Pennsylvania. *Id.* at 21 ("An algorithm that is unable to perform well for such a simplified problem is not likely to be useful for an actual redistricting problem.").

Despite these clear explanations from Dr. Cho concerning her opinions of Dr.

Chen's algorithm and how she was able to reach those opinions, Petitioners have filed the present Motion seeking to exclude Dr. Cho from offering *any* testimony on Dr. Chen on the basis that: (a) she did not review the actual algorithm used by Dr. Chen; and (b) her reliance upon the Fifield Paper to criticize Dr. Chen was inappropriate. For the reasons discussed below, neither of these arguments has any merit, and Petitioners' Motion should be denied.

II. ARGUMENT

The ability of an expert witness to testify is governed by Pennsylvania Rule of Evidence 702, which provides:

A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:

- (a) the expert's scientific, technical, or other specialized knowledge is beyond that possessed by the average layperson;
- (b) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue; and
- (c) the expert's methodology is generally accepted in the relevant field.

Pa. R. Evid. 702.

A. Dr. Cho's Criticisms of Dr. Chen's Methodology Are Admissible.

Here, Petitioners contend that Dr. Cho's methodology was unacceptable because she did not analyze what Petitioners describe as the "relevant data," namely,

Dr. Chen's algorithm. Mem. Supp. Motion at 5. Petitioners, however, misconstrue Dr. Cho's analysis and her assessment of the algorithm.

In relevant part, Dr. Cho gave the foundation for her opinions in her report as being derived from Dr. Chen's published research and the description of his algorithm. Motion, Exhibit A, Cho Report at 18-19. She offered the following as one of her criticisms of Dr. Chen's simulation approach:

Chen does not sufficiently describe or validate his algorithm in his academic work. He has a non-technical publication that describes the basic idea that inspires his algorithm (though he has obviously modified that general framework for his analysis of Pennsylvania, which is far more complex). He has not a single technical publication in a statistics, operations research, or computer science journal that rigorously explores the properties of his algorithm or how the algorithm might scale with problem size. He does not describe or validate his algorithm in his report here.

Id. at 19; *see also id.* at 18 ("The movement of one voter tabulation district (VTD) from one district to another district, for instance, may simultaneously preserve a city but make population deviation worse. There are a large number of such conflicts between the objectives, but Chen does not describe how his algorithm would resolve such conflicts."); *id.* at 26-27 ("The algorithm has not been vetted by the academic community, published in a scholarly statistics journal, justified in the report, or even described in any detail in the report.").

The thrust of Dr. Cho's criticism was the lack of adequate validation and peer-

review of Dr. Chen’s methodology. Dr. Cho provided her analysis by relying upon what Dr. Chen said (or failed to say) about his algorithm in his own report. She did not need to review the algorithm itself. Indeed, Dr. Cho explained that time constraints prevented her from viewing the algorithm, but that this did not affect her ability to provide her opinion:

[T]he point is not whether I would have been allowed some short amount of time to view the code, but whether the algorithm has been sufficiently scrutinized by the scientific community to allow others, including the courts, to have confidence in the process and results. Transparency is warranted, not simply to me in a short amount of time for one court case, but to the entire scientific and legal community. It should be subject to peer review and accepted in the scholarly community.

Id. at 18, n.4.

Dr. Chen’s failure to appropriately confirm the effectiveness of the algorithm is not merely a harmless oversight, as Dr. Cho explained how the algorithm does not account for fundamental conflicts in redistricting objectives. *Id.* at 18 (“The movement of one voter tabulation district (VTD) from one district to another district, for instance, may simultaneously preserve a city but make population deviation worse. There are a large number of such conflicts between the objectives, but Chen does not describe how his algorithm would resolve such conflicts.”). In other words, Dr. Cho’s identification of the problems with Dr. Chen’s algorithm, and the

problems about which she will testify at trial, are derived from the most important piece of “relevant data” that exists—the expert report of Dr. Chen.¹

B. Petitioners’ Criticism of the “Fifield Paper” Is Without Merit.

Petitioners also contend that “it is not accepted in the scientific or any other community to criticize one expert’s work by analyzing the work of an entirely different person,” and that “Dr. Cho’s methodology of criticizing Dr. Chen based on Fifield’s algorithm is not only unsound; it is irrelevant and should be excluded on that basis as well.” Mem. Supp. Motion at 6. Not only do Petitioners fail to cite any law in support of this proposition, but they again miss the point of Dr. Cho’s analysis.² Dr. Cho ran a Monte Carlo simulation using Fifield’s data set, which Fifield had employed for a small-scale validation study. The advantage to Fifield’s data set was that it was small enough (containing only 25 precincts to be divided into 3 districts) that one could enumerate all possible map combinations. This, in turn, allowed her to demonstrate the shortcomings of Monte Carlo simulations in

¹ Petitioners contend that “[w]illful blindness is not an accepted scientific methodology. And it certainly is not generally accepted in the scientific community to suggest that another expert’s work is unreliable because that expert has not disclosed his algorithm, when the expert in fact did.” Mem. Supp. Motion at 4. But Dr. Cho was not “willfully blind” to the algorithm. She explained in her report why she did not review the algorithm and, just as importantly, why such review was not necessary to her analysis.

² Petitioners’ argument that experts cannot rely upon the works of others in forming their opinions is just silly. If this were the case, an expert could never rely upon the research, data, studies, and findings of other scholars in their field to show why an opposing expert’s conclusions were erroneous.

redistricting to provide a sense of perspective as to the problems posed by Dr. Chen's analysis of Pennsylvania, which has thousands of precincts and 18 districts. Dr. Cho's reliance upon data generated by others in her field in order to make this comparison and explain her opinion is perfectly reasonable. *See* Pa. R. Evid. 703 ("An expert may base an opinion on facts or data in the case that the expert has been made aware of or personally observed. If experts in the particular field would reasonably rely on those kinds of facts or data in forming an opinion on the subject, they need not be admissible for the opinion to be admitted.").

In sum, Dr. Cho's analysis of Dr. Chen's simulated maps and the algorithm used to generate those maps is adequately explained by Dr. Cho in her report, and Dr. Cho has further explained that she did not need the algorithm itself in order to reach her opinion. Petitioners' Motion should therefore be denied.

III. CONCLUSION

For all of the foregoing reasons, Legislative Respondents respectfully request that the Court deny Petitioners' Motion.

December 11, 2017

Respectfully Submitted

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