

FINAL MEETING SUMMARY

Community Environmental Working Group

“Striving for Continuous Environmental Improvements at Intel”

Date: February 20, 2019
Time: 1:00–3:00 p.m.
Location: Corrales Community Center

Members Attending

John Bartlit, NM Citizens for Clean Air & Water
 Mike Williams, NM Citizens for Clean Air & Water

Hugh Church, American Lung Association in New Mexico
 Sarah Chavez, Intel
 Dennis O’Mara, Corrales resident, Corrales Residents for Clean Air and Water

Non-Members Attending

Marcy Brandenburg, Corrales Residents for Clean Air and Water
 Erika Edgerly, Intel and Corrales Resident
 Carolyn O’Mara, Corrales Resident
 Alexander Lowry, Intel
 Heidi Krapfl, Invited Panelist
 Dr. Andy Rowland, Invited Panelist
 Kristin Sagert, Corrales Resident

By Phone:
 Dr. Elijah Stommel, Invited Panelist
 Steve Dickens, Invited Panelist

Jessie Lawrence, Facilitator

CJ Ondek, Recorder

HANDOUTS

- CEWG Draft Agenda
- January Draft Meeting Summary
- Action Item Progress Report
- February EHS Activity Report
- Final CEWG Question for Panel
- Speaker Bios
- CRCAW Perspective Paper
- NMDOH ALS Study Report
- Work Methods of CEWG

SPECIAL PANEL DISCUSSION PROPOSED AGENDA

- Welcome and Introductions
- NMDOH ALS Report Panel/Dialogue
- Adjourn

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 Prepared or presented by: CJ Ondek & Jessie Lawrence
 Prepared for: CEWG
 Date prepared or presented: February 25, 2019

SPECIAL PANEL DISCUSSION

WELCOME, INTRODUCTIONS

John Bartlit opened the meeting by stating the CEWG mission, which was to make environmental improvements at Intel, reduce chemical emissions at Intel, and improve community dialogue. Introductions were made. He referred attendees to the meeting handout describing the CEWG's work methods and work products.

Guest Responses to CEWG Questions

Each panel guest was asked to spend 10 minutes responding to CEWG questions. These five questions were:

1. The study author has calculated and then compared a single prevalence rate in Corrales for the entire 16-year duration of the ALS study to the estimated annual national ALS prevalence rate of 5 per 100,000 as determined by the Agency for Toxic Substances and Disease Registry. Do you agree or disagree that this is a reasonable and technically sound approach? Why or why not?
2. Did the DOH use the correct approach to calculate prevalence rates in this study? Are there advantages or disadvantages to using the results to calculate the annual prevalence rates to compare with the national estimate which is also an annual rate?
3. In studies of this scope, are the available data typically sufficient in detail; how are the data typically put to use? How are similar studies typically done elsewhere?
4. What (if any) other statistical methods exist to analyze data from a study like this, in which the numbers of cases and population are small? Can the results of those analyses be compared to the estimated national prevalence rate of the ATSDR or are would they have to be compared to some other standard to put the results in context? What are some other types of standards?
5. A member of Corrales Residents for Clean Air and Water (CRAAW) requested the NM State Health Department to undertake this study and to include 12 census tracts that abut or are near to the Intel plant. Previous anecdotal reports indicated that cases also occurred in Rio Rancho during the study period. And since census tracts in far NW Albuquerque also abut the Intel plant, CRAAW believes that those census tracts should be included. The study only included the two census tracts that comprise Corrales. Do you agree or disagree that adding the 10 additional census tracts is a reasonable request? What do you see as the advantages and/or disadvantages of adding these 10 census tracts to the study?

Heidi Krapfl, New Mexico Department of Health (NMDOH)

Heidi Krapfl responded to Question 1 by citing the two challenges the New Mexico Department of Health (NMDOH) study faced with estimating ALS prevalence in Corrales: 1. A small sample size and 2. A rare disease. Combined, those two things made it very difficult to estimate the

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disease prevalence. With a larger sample size (population) there was a greater likelihood of showing statistical significance.

Ms. Krapfl explained that a stable estimate in a population can be illustrated when prevalence is pretty consistent every year over a period of time. This would result in a narrow confidence interval. Calculating an annual prevalence rate for a rare disease in a small population would create a very wide confidence interval showing a lot of variance. The NMDOH ALS study was designed to combine all the requested years to arrive at a more stable estimate.

Ms. Krapfl provided a handout to illustrate the concept of “stable estimate” that compared trend lines for two communities over eight years. On the handout the Community X graph line showed data stable over eight years, while Community Y’s varied greatly. Comparing Community X to Community Y in 2001 (one year) showed that Community X had a higher diabetes death rate for that year in general, but that was not actually accurate in terms of overall risk of diabetes death for each community. The reason behind this was that there were random variations in the number of deaths. Looking at all eight years it was clear that Community Y had a higher death rate than Community X. Applying this example to show the challenge of the small sample size in Corrales, Ms. Krapfl said data for one year showed “0” cases of ALS in Corrales, which was not an accurate representation of overall ALS risk in Corrales.

Dr. Elijah Stommel, Dartmouth University

Dr. Stommel said he wanted to clarify that he was a neurologist and not an epidemiologist. He said it was important to know the final study question. Was the study trying to only determine higher ALS prevalence in Corrales, or was it looking for cause and effect? Ultimately, the goal should be to know why these people came down with ALS and perhaps at a higher rate than in other communities. A problem with ALS was that it was probably a genetic susceptibility disease with some risk factors and environmental triggers over time that worked similar to cancer. Exposure could come as early as in-utero or shortly thereafter.

Dr. Stommel said that unless there was good data on each patient that included a thorough questionnaire as to where they had lived, what they did for work, past medical history, family history, military history, good habits/bad habits, vaccines, etc. they probably would not have enough data to figure out what caused a probable higher incidence rate. Having the mortality rate was helpful to compare to incidence rates across the country. Incidence rates changed from region to region and no one knew why. For example, in northern states the incidence was 3 per 100,000 per year versus 2 per 100,000 per year in the south. He cautioned about mortality data; some forms of ALS were not called ALS and had a different ICD number, so some cases were easy to miss. These included primary lateral sclerosis, motor neuron disease, progressive muscular atrophy, etc.

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Dr. Stommel cited some ALS risk factors out of a long list of ALS risk factors, including head trauma, aromatic solvents, persistent organic pollutants, certain bacteria, magnetic fields, formaldehyde (funeral directors have higher rate of ALS), infections (possibly), athleticism, etc. He commented that Heidi Krapfl did a good job outlining how false data was arrived at by not having large numbers over a long period of time when determining prevalence rates. He ended by saying that although wanting to find out prevalence rates was a good start, the ultimate question to ask was why people had ALS.

Steve Dickens

Steve Dickens began by saying he was not a trained epidemiologist or statistician but had worked with the top environmental epidemiologists around the country for the last two decades on similar issues. In response to the first CEWG question, he said that in an ideal world, researchers would want to compare apples to apples. In this case, that was comparing local prevalence data with comparable regional data across a similar demographic. However, that was not possible here. So, the study was on questionable methodological grounds, which was understandable considering the limits. With this in mind he had some questions around how the expected number of cases was determined. He was concerned because they were inferring a long 16-year period prevalence from a short 1-year period prevalence, and he wanted to know how that calculation was performed. How one might do this is complex. For example, some of the cases found in Year 1 might be repeated in Year 2, and how to treat that was important. He said he believed the only way to accurately compare a long period prevalence versus a short period prevalence was to know the dates of diagnosis and death to be able to clearly map out what was happening. He said the numbers might be too small to come up with any conclusions.

Mr. Dickens said another challenge, which was a core problem in environmental epidemiology, was that problems were often more localized than country, town or even census blocks. Environmental health problems did not occur randomly and tended to occur in close proximity to the source of the toxic substances causing the problems. He cited a health study conducted in Corrales in the 90s, where they mapped the community into quadrants and looked at a whole series of health outcomes. They found that people who lived in quadrants closer to Intel had higher levels of adverse health outcomes than those living further away. The study demonstrated a statistically significant relationship between exposure to toxic substances emitted into the air from Intel and adverse health outcomes. If they had looked at the entire population of Corrales and compared it to another community they wouldn't have found the health problems because the health problems found were more localized. He advised that the ALS analysis needed to consider this issue. He cited a paper called "Inconclusive by Design" about ATSDR studies across the county that were inconclusive, because the study design itself made it almost impossible to find a problem. These problems, especially health problems that have a very small occurrence normally, are hard to detect. For example, consider a disease that occurs in 1 in 100,000 people. Now let's assume that because of exposure to a toxic substance that number

increased to 5 in 100,000 people, a 5-fold increase. But what if the community in question had a total population of only 5,000 people. One would be unlikely to detect even such a 5-fold increase, given the small population. A study that only looked at the occurrence of this rare disease would be unlikely to find an effect, even if it was present.

He said a solution was to borrow from the work of homicide detectives. They did not employ statistics to demonstrate that someone was guilty; they instead attempt to find enough evidence to build a compelling case that would enable a jury to draw a conclusion beyond a reasonable doubt. Many years of Intel data, the study in the 90s, etc., show the concerns have at least some potential for being valid. They needed to keep assembling more data and make the case to the larger community. He reminded that the study in the 90s chose to look at more common outcomes like irritable bowel syndrome, pain, headaches, etc. because these events were fairly frequent and thus provided the statistical power necessary to be able to detect what was going on. And, in fact, it did detect that something was going on.

Dr. Andy Rowland, University of New Mexico

Dr. Andy Rowland said he wished the tools epidemiology had to offer were more effective. He cited an important principle in environmental health that people should not be exposed to toxic substances even if long-term effects were not known. He urged the community to keep pushing to reduce the levels of solvents, VOCs, particulates, etc., being emitted from Intel. Working toward lower exposures was important. He said New Mexico had a huge problem with access to neurologists. There were only two board certified specialists in New Mexico to evaluate Parkinson's disease, and sometimes the wait time was over a year. Having a registry of neurological diseases in New Mexico and increasing the numbers of board-certified specialists would be a step forward.

In regards to question 1, Dr. Rowland said epidemiology didn't work well with small populations and rare diseases. The challenge was the role of chance, which resulted in small shifts from year to year, and it would be difficult to separate this out. Overall the ALS study approach undertaken by the NMDOH looked reasonable and technically sound to him. There were too few ALS cases over the time period specified to not combine years in the study. Combining the years was the best way to look at the data rather than looking at the data year by year, as Ms. Krapfl had demonstrated earlier. Looking at yearly fluctuations would yield rates that were too unstable to be useful. NMDOH's study outcome showed prevalence rates in Corrales as similar to the national rate, and he did not dispute this outcome. Cluster studies having small numbers were difficult to undertake using epidemiology. He cited a book by Dan Fagin about cancer clusters in Toms River, New Jersey, (Toms River: A Story of Science and Salvation) that explained why these kinds of studies were frustrating to both the community and public health researchers. Small numbers couldn't show a consistent pattern of disease, which was the only tool that could validate a disease cluster.

Guest Questions and Comments for Each Other

- Steve Dickens asked Heidi Krapfl how NMDOH came up with 8.1 as the expected number of cases in Corrales, and how they considered or did not consider disease duration. Ms. Krapfl said the only ALS registry was the national registry, and they reported ALS prevalence by age group. By taking the population of Corrales and applying the Registry's prevalence rate by age group, they then calculated the expected number of cases in Corrales for each age group. They took these numbers per age group and summed them up to come to 8.1 expected cases from 2000 to 2015. Steve Dickens he was still unclear on how they got the expected number of cases in a 16-year period. Ms. Krapfl said that given a population base of 8,000 people per year, then you multiply by 16 to get total population and then calculate how many people would be expected to have ALS in that 16-year period. The approach in the study was to look at death data and hospitalization data, make sure ALS was defined the same way, and call the certifying physician for confirmation, etc. Mr. Dickens asked if a case fitting the definition of ALS was counted twice in a subsequent year. Ms. Krapfl explained it was only counted once because they were counting prevalence, which was at any given time the number of people who had the disease, and not the number of new cases (incidence rates). A challenge they had was that the diagnosis date was not always clear. The other problem with an annual prevalence rate was that in some cases there was no diagnosis date other than what was on the death certificate. It was arbitrary to say that a person was diagnosed in a certain year, say 2011, and then hospitalized in 2012, 2013, 2014. So, that person was only counted once, Ms. Krapfl said.
- Steve Dickens said the problem was that they were comparing apples and oranges, because ATSDR counted cases within a 12-month period and the same case, if still alive, would be counted in subsequent years. They looked at "live" cases, and each case would continue to be counted every year. Andy Rowland said that was not such a problem because the NMDOH overall rate was 5 for 100,000, which was the same as the ATSDR one-year prevalence rate. He cautioned about getting too sidetracked on these details. The real issues in question here were more about case definitions and Census tracts.
- Dennis O'Mara explained the community's problem. Prevalence was an estimate of the average life span of a person with ALS. When the national incidence rate of 2 per 100,000 as per the National ALS Society was applied to the Corrales population, the resulting number over the entire 16-year study period was 2.68, not 8.1 cases. Heidi Krapfl said that she could not count incidence due to lack of diagnosis dates and lack of detailed data. What they did get was every death certificate for most people and looked at ICD codes specific to ALS. A national registry researcher told them to also look at the string text.

Sometimes the death certificate did not mention ALS if a person died of pneumonia, for example. The string text showed more detail than just the death certificate alone.

- Elijah Stommel pointed out that, in looking at the figure that showed patient location in reference to where Intel was on the map, cases were not south of Intel but north, east or west. Dennis O'Mara said that communities in Rio Rancho or far west Albuquerque were not investigated. These areas were open and fertile grounds for investigation and represented 10 of the 12 Census tracts that CRCWA wanted targeted that totaled to a population of about 52,000. The wind blew in all directions, and communities in all directions were susceptible to exposure.
- Marcy Brandenburg asked Dr. Stommel what other neurological diseases were associated with environmental toxins. Dr. Stommel said there was a strong association between Parkinson's disease and pesticides, and this was well established. He was working to look at Parkinson's patients in relationship to ALS patients in GIS-mapping, which was a lot of work. The neuro-degenerative diseases were probably related somehow and probably it was a combination of genetics and exposure. Ms. Brandenburg asked if he suggested that the group should turn their focus to other diseases in addition to ALS. Dr. Stommel said that looking at Parkinson's might make sense because it was more common, but it was a neuro-degenerative disease and not a muscle-wasting disease and different parts of the spinal cord and brain were affected.
- Andy Rowland emphasized quite clearly that epidemiologists were laser-focused on one disease at a time and were uncomfortable combining across diseases. If it is done at all, it has to be done very carefully and really make sense. In the case of ALS, Dr. Stommel mentioned some other conditions that are very similar to ALS, that it might make sense to include like primary lateral sclerosis, motor neuron disease, progressive muscular atrophy, etc.
- Heidi Krapfl said the question the study looked at was: Was there a difference between the ALS prevalence rates in Corrales compared to the state and national prevalence rates. The typical approach in the Department of Health was to start with county level specifics such as mortality data. DOH initially looked at ALS mortality rates for Sandoval County and the State of New Mexico, didn't see a difference. NMDOH focused solely on Corrales because they kept hearing that it was people in Corrales that were concerned about ALS from 2011 until now. She talked about the difficulty in determining the link between environmental exposure and disease state.
- Steve Dickens said that he was involved in many studies across the country that demonstrated a clear link between adverse health outcomes and exposure. It was not always about demonstrating causation, which complicated things. They were not

comparing county-wide health data, because they would never see anything. To get more precise and be able to demonstrate a finding, they would compare health outcomes between those who and who was not exposed to the contaminant of concern. In his Corrales study, researchers developed a proxy for exposure, which was the frequency and extent of the chemical odors smelled in the air. What they found was a high correlation with both the people who smelled odors in the air and who lived close to Intel, and adverse health outcomes.

- Elijah Stommel said he had to leave the discussion to attend to clinical duties but thanked everyone for inviting him to participate.
- Dennis O'Mara said in his background paper he proposed a reasonable way forward that would require very little human resources and time. He proposed to look at death certificates in the 12 Census tracts, which might give them the answer to their question on ALS prevalence.
- Steve Dickens said if the CEWG had a large grant or the ATSDR wanted to spend \$2M on a study to figure out what was going on in Corrales, they could do a much more thorough study and find something or not. This would take an enormous amount of work. Taking a shortcut in this case might reveal cursory information to start with and not a final conclusion.
- Andy Rowland asked if they rejected the argument around data fluctuation in a year-by-year approach.
- Dennis O'Mara said he understood numbers might jump around, but on the other hand if chemicals from Intel have triggered ALS cases, and Intel's use of chemicals changed constantly as their production process changed, then wasn't it possible that over a given period of time a particular chemical might have been involved in triggering ALS. If so, then they might find a blip. It would be interesting to see if that existed, and if so, then a much more detailed, broader investigation was warranted. Doing this might give the community the answer that they are seeking, which was whether something more needed to be done.
- Heidi Krapfl said she was unsure whether Mr. O'Mara would be able to get the answer he wanted, which was "is there a difference." Looking at death certificates, etc., for all 12 Census tracts year-by-year would still result in confidence intervals so big that they would be unable to see a difference or answer the question on death rate. Dennis O'Mara said that his suggested approach was to plot cases by years of death first, and then apply the average number of years a person lives after diagnosis (3 years). In looking at the 12 Census tracts,

how many ALS cases would it take in any one year to say “this is beyond chance,” he asked. Ms. Krapfl said they would have to do a specific calculation to get that number, called a power calculation. Mr. O’Mara asked why they couldn’t do that calculation. Ms. Krapfl responded that they could, but that it was really the population size driving the ability to detect any increase in ALS cases. Each Census tract would be so small that a difference would not be able to be detected.

- John Bartlit asked Andy Rowland if there was any chance to get UNM students to work on this research as part of their student projects. Dr. Rowland said maybe, if they had a data set, they could work with NMDOH. He asked if NMDOH had access to VA and Medicare data, and if they did then the students could possibly do something relatively easily with the data. Heidi Krapfl explained that they had nonfederal data but not federal data, but they were able to get federal data in other indirect ways.
- Dennis O’Mara said that he had asked the National and State ALS Associations to collaborate on this study and neither were initially helpful. Maybe they could ask again for the State ALS Society to contact ALS patients within the study period (or their family members) and obtain signed releases so the State Health Department could contact their doctors and obtain the needed medical records. Andy Rowland said there were efforts to establish an ALS state registry and to help bring more neurology specialists to NM. He cautioned against going on a “fool’s errand.” It was important to do the study professionally so it stood up to criticism. Epidemiology studies were expensive and doing it halfway was very unsatisfying for all involved. The confidence interval issue mentioned by Ms. Krapfl was problematic, he said. The 60,000 population number for the 12 Census tract area was under the 100,000 number used for calculating the rate of ALS which means that small number problems will still be an issue. Also, a key element to know was who in those 12 census tracts had been exposed.
- Heidi Krapfl said exposure was very tricky to figure out. Some people were probably exposed before they could smell something and then after that desensitized. It was difficult to truly discern exposure and exposure concentration. The composite exposure was different for each person along with genetic susceptibility.
- Marcy Brandenburg said the community had been trying to figure out what was going on around the health effects of Intel emissions for the last two decades, and NMDOH had to walk hand in hand with them to help them figure it out.
- Andy Rowland asked about air monitoring. Sarah Chavez said Intel had done FTIR sampling every year since 2001, which was regulated by their air permit. Marcy Brandenburg questioned the veracity of the data, since there was little oversight by a third party into Intel’s collecting and the reporting on the data.

- Dennis O'Mara said in 2014, a local group in Oregon raised concerns about ALS cases in their community. A Portland TV station doing investigative reporting found over 40 ALS cases in the vicinity of Intel facilities there but he said he didn't know the locations of the cases or the populations of the areas in question. Of concern is that 7 cases occurred among Intel employees including 3 who had worked together in a unit of less than 100 cleaning chips. Andy Rowland asked if there was a way to get occupational data for Intel employees.
- Dennis O'Mara asked Heidi Krapfl if she was willing to take a shot at the study he proposed. Ms. Krapfl said it was not just her decision and she had to take the request back to NMDOH. Mr. O'Mara stated his proposal, which was to look at death certificate data in 12 Census tracts during the 16-year study period, plot them on a graph and add three additional years—the middle ground of survivability of a person once diagnosed—behind each one, and then to look at the graph to see if the results were big enough to raise a concern.
- John Bartlit suggesting laying out the study beforehand, agreeing on the contingency, and making decisions ahead of time. This procedure proved to be valuable in CEWG's previous crystalline silica study.
- Heidi Krapfl said for the 2 Census tracts study, they looked at death certificate, medical records, and hospitalization data, which was more in-depth, but reasonable because the population of Corrales was so small. She did not think it was appropriate to expand to 12 Census tracts because of exposure. Corrales was the community that was concerned about ALS and one of the most studied communities in the state. She explained that death certificate data was an appropriate data source that is collected systematically and could be used to analyze additional Census tracts, potentially.
- Andy Rowland said that focusing on yearly rate was not the way to do it. He suggested looking at death certificate data in the whole state and then to compare that state rate overall to the 12 Census tracts.
- Dennis O'Mara said that would be helpful. He reiterated that this study was never intended to focus on identifying cause. Also, the community was always on record about wanting to look at the 12 Census tracts, because Intel was situated right in the middle of these tracts and the wind blew in all directions. Looking at the 2004 map plotted by community members, four ALS cases were in Rio Rancho, which they learned about through community interaction.

- Andy Rowland said that Heidi Krapfl would have to let us know what the state of NM could and could not do. He stressed the importance of developing a hypothesis ahead of time. He said it seems like the ground had shifted and now the question CEWG wanted to know was if employee or community exposure to Intel resulted in higher rates of all neurological disease. This needs clarification.
- Heidi Krapfl said it would be fairly straightforward to compare ALS death rates in New Mexico, the USA and the 12 Census tracts. She said she didn't want to mess with this three-year backup approach (going 3 years back from death date to determine diagnosis date). A potential snag might be with collecting national data; she was not sure if the string text on the death certificate was available. John Bartlit again suggested setting procedures ahead of time.
- Heidi Krapfl explained that when there was a community health concern the NMDOH developed the study. In this case, no one from Rio Rancho or Albuquerque came forward with a concern. Marcy Brandenburg said she was from Rio Rancho. Ms. Krapfl corrected herself and said no one with ALS from Rio Rancho or Albuquerque came forward.
- Steve Dickens said that with mapping ALS cases, they might find that all 12 cases were within one block of Intel, and that would change the picture. He strongly emphasized that they could not apply standard epidemiological techniques to environmental health problems, but they must look at locations. He said there were several studies to support concerns around adverse health outcomes as connected to toxin exposure, including a 2006 study on ALS cases in IBM workers by Dr. Dick Clapp, a well-known environmental epidemiologist from Boston, and another published study by Dr. Marc Weisskopf at Harvard that looked at ALS cases among programmers and lab technicians. Heidi Krapfl confirmed that the ALS cases in Corrales were equally distributed between the two census tracts. Steve Dickens said that was good to know.

Jessie Lawrence said time was nearly up and asked if anyone had any last comments.

- Dennis O'Mara said he appreciated everyone's participation and listening and that he hoped Heidi Krapfl and NMDOH had some good news for the community after they had a chance to think about it. Heidi Krapfl said it was important for the group to think about how they would respond if further examination showed no difference. John Bartlit said they would write everything down in advance.
- Marcy Brandenburg asked if they could collect the data systematically by Census tract as a way to know proximity to Intel. Ms. Krapfl said they already had the two Corrales Census tracts, but that also included hospitalization data. The quickest way to do it for the

additional Census tracts was to look at death certificates and note the address on the death certificate, but there would not be any information on the length of residency. Andy Rowland said there would always be “noise.”

- John Bartlit asked Andy Rowland if he was willing to work as an advisor and participate by phone at times. Dr. Rowland said he would be happy to help, and he didn’t want anyone to walk away feeling frustrated. But they were dealing with a difficult problem. He stressed again that if they were going to focus on year-by-year, they would “fall into a ditch.” Heidi Krapfl said maybe looking at chunks of years, say 5 years, would make more sense than year-by-year. She asked the group to think about what the research question should be. Mr. Bartlit asked Ms. Krapfl to also think about the question.
- Steve Dickens asked if there was a health condition or health conditions that had a higher background occurrence in the population and that was a significant concern worth studying, for example, the symptoms of ALS such as slurred speech, weakness, etc. Doing so would provide statistical power. His fear was they may not find anything with the revised study, but that would not mean there was not a problem. Heidi Krapfl said that was a good point. The concern was about exposure.
- Andy Rowland said the death certificate study could make sense in ALS (because of its rapid mortality rate unlike other diseases like Parkinson’s which have a different course). Heidi Krapfl said they could look at which years had the highest exposure. Dennis O’Mara said that he assumed the exposure was more significant in the earlier years of the study period. Ms. Krapfl suggested a hypothesis: The aggregated death rates of ALS from 2000 to 2010 in these 12 Census tracts would be higher than the state of New Mexico. Andy Rowland suggested looking even further back, in the 1990s when exposures were highest (according to several people at the meeting).

ADJOURN

NEXT MEETING: March 20, 2019, 5:15 pm to 7:00 pm, Corrales Senior Center.