

10/19/10

Analyzing and Forecasting Healthcare Workforce
Dynamics in a Turbulent environment



**A Geo-Spatial Approach
to Understanding Our
Internal & External
Workforce Over the
Long Term**



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Understanding the Workforce Dynamics of Stanford Hospital and Lucile Packard Children's Hospital (Palo Alto, California) using Demographic & Geographic Techniques...6 Month Project

❑ **Healthcare Industry Challenges** – Those of us in the Healthcare Industry, specifically Hospitals, are in uncharted territory relative to understanding and planning our workforce. Some of the current 'unknowns' are...

- Recent Healthcare Reforms
- An Aging Workforce
- Concerns about Shortages
- And, of course, the usual Disasters and Pandemics

❑ **Supply & Demand as Our Conceptual Framework** – A 'supply-side' (vs. 'demand-side'), approach to understanding the data, because here-to-fore it was out-of-reach

❑ **Unique Approach to Analysis/Trending** - GIS (Geographical Information Systems) provides us the 'Visual Edge' as we begin to move further into modeling and prediction

❑ **Economic, Demographic & Historic Considerations** – Key parts of our analysis

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Methodology

- Synchronization:** Match Internal-to-External Job Groups for comparison (e.g. CLS)
- Create Job Families: Creation of Job Family data sets:**

Nurses/CNS, NP's/PA's, Rehab (PT's, OT's, Speech & Audiologists), Labs (Staff Medical Techs, Histologist, Cytologist, etc.), Imaging (Radiology, CT, MRI, etc.), Pharmacists and Respiratory Therapists

- Internal Data Collection and Preparation Tools:** Lawson HRIS for employee data & Green Tree for applicant data; also Excel, MS Access, ArcGIS, etc.
- External Data Collection:** ESRI, U.S. Census, State of California (various Departments), U.S.G.S., S.F. Bay Area MTC, U.C. Santa Barbara, U.C. Berkeley, & Stanford University
- Mapping:** Geographical ArcGIS (ArcView, Spatial Analyst, etc.)
- Analysis:** Of Job Family Trends (note: Due to the Large 'N', in many cases, the various Nursing populations are used as a proxy for other groups)
- Feedback Loops:** Feedback from various Hospital Departments and Leadership
- Actionable Plans:** Develop 'Actionable' Talent Acquisition, Retention, Site Selection and/or Emergency Preparedness Plans

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INTERNAL WORKFORCE (SUPPLY)



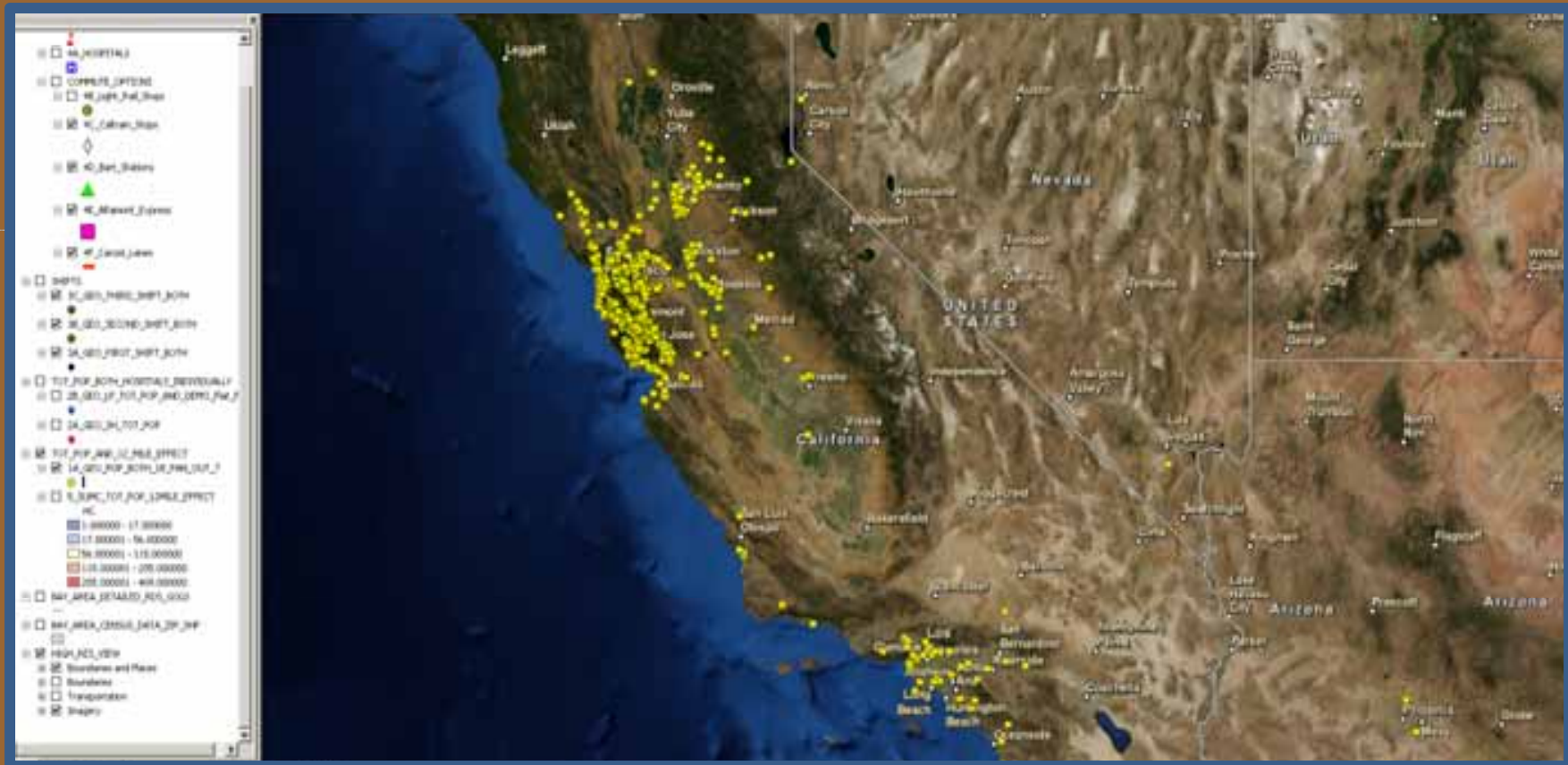
OVERVIEW

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RANGE



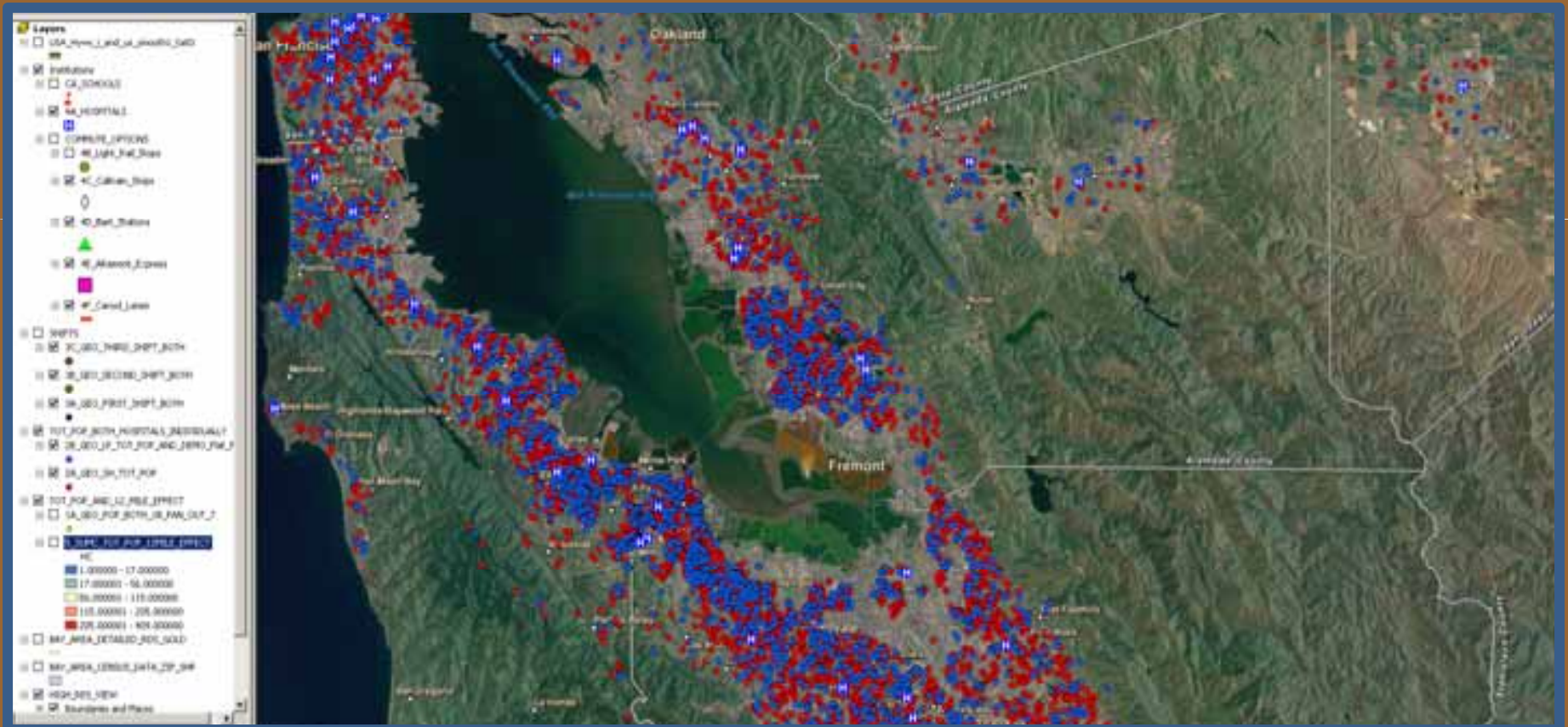
OREGON TO LOS ANGELES

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DENSITY BY HOSPITAL



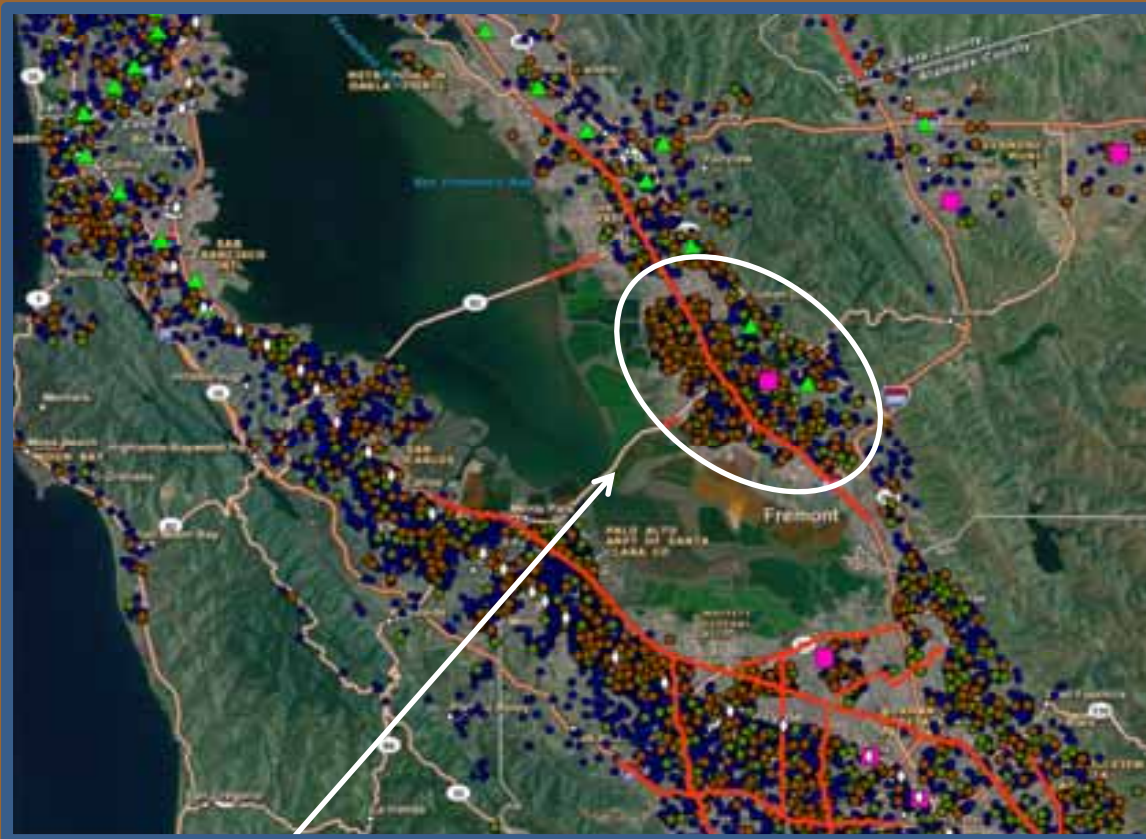
--- NO MAJOR TRENDS IDENTIFIED

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SHIFTS AND POSSIBLE COMMUTE OPTIONS

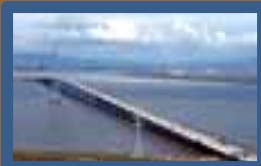


SHIFTS:

- Brown Dots = 3rd Shift,
- Olive Green Dots = 2nd Shift,
- Blue Dots = 1st Shift

COMMUTE OPTIONS:

- Green Triangles = BART (Bay Area Rapid Transit),
- White Diamonds = Cal Train,
- Pink Squares = Altamont Train,
- Orange Lines = HOV Lanes



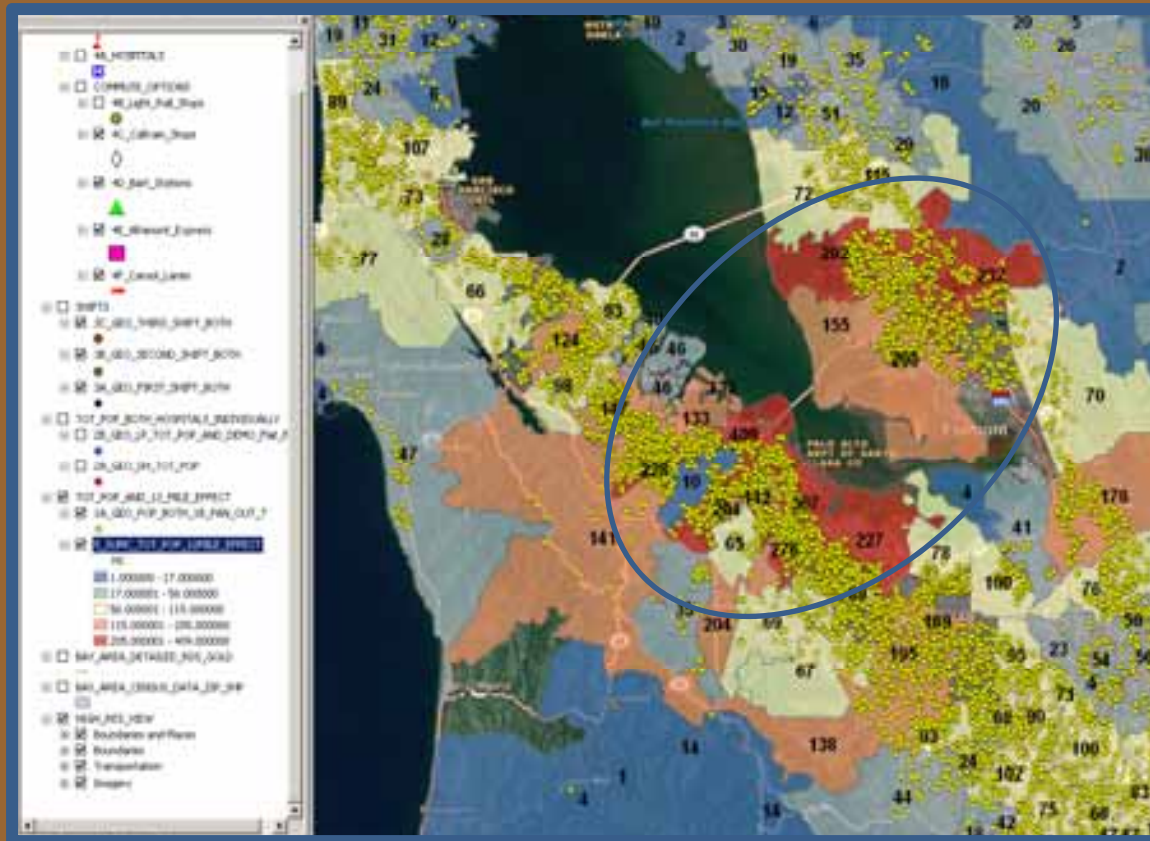
DUMBARTON BRIDGE: WHILE NO MAJOR TRENDS WERE PARTICULARLY IDENTIFIED, IT DID BECOME ABUNDANTLY CLEAR THAT ONE PRIMARY COMMUTING THOROUGHFARE, THE DUMBARTON BRIDGE, SERVED A HUGE PORTION OF OUR ORGANIZATION. BUILT IN 1982, IT 'OPENED UP' THE EAST BAY TO MORE AFORDABLE BEDROOM COMMUNITIES. (IT IS THE LAST BRIDGE TO BE RETROFITTED IN THE BAY AREA . CONSTRUCTION BEGINS THIS YEAR)

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DETAILED DENSITY & LOCATION: S.U.M.C TOTAL POPULATION (Choropleth & Geocoded)



‘THE 12-MILE EFFECT’: Confirmation of one part the ‘age old’ recruitment hunch, most healthcare workers, especially Nurses are attracted by Pay Rate, Shift and Location (Shifts and the ‘Emergency Culture’ would seem to dictate close proximity to workplace)

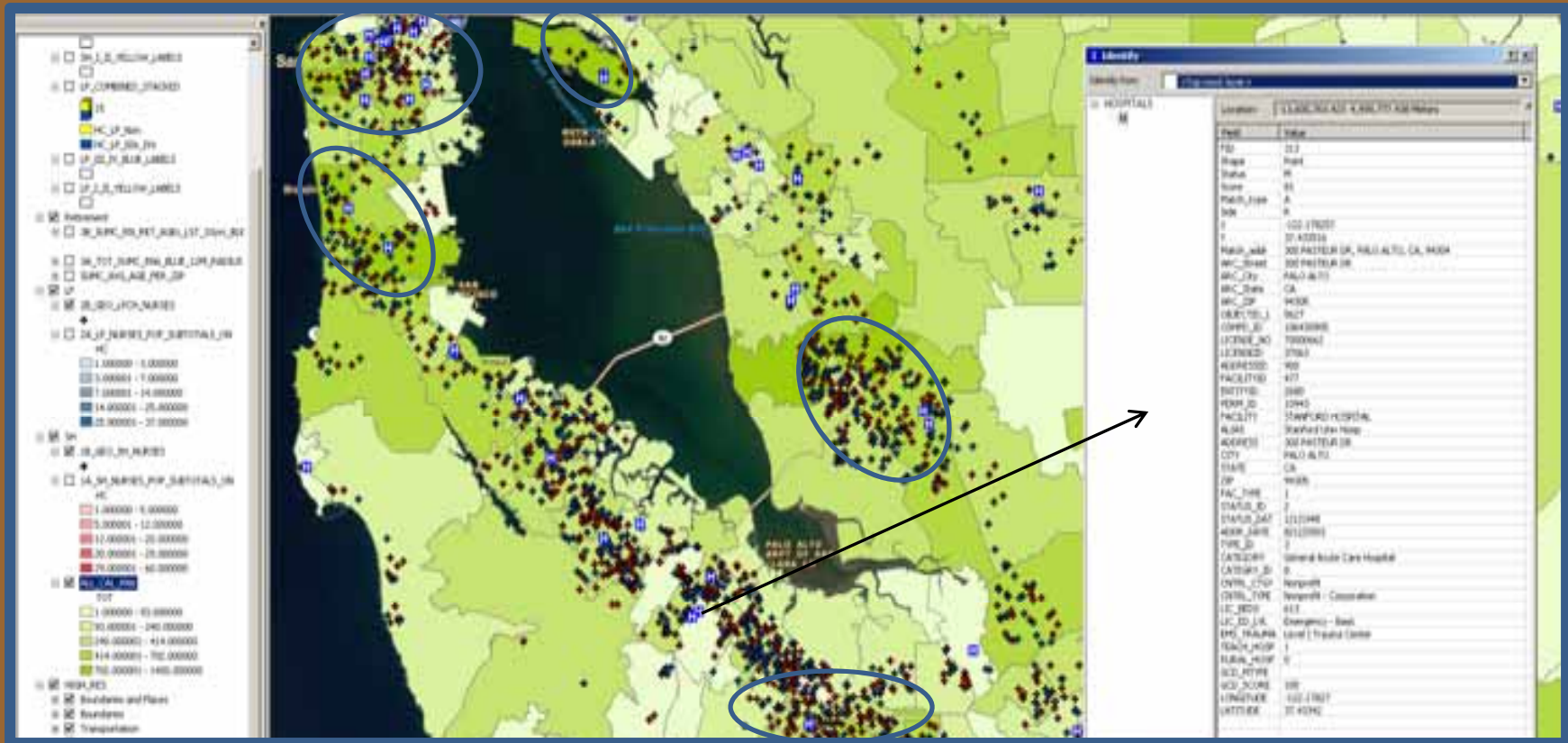
IMPORTANCE: Implications for our Aging workforce, workforce Turnover & our Future workforce (applicants)

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CLOSER INSPECTION: DENSITY & LOCATION



S.U.M.C. NURSE POPULATION BY HOSPITAL LAYERED ON TOP OF ALL CALIFORNIA NURSES

TREND / PHENOMINON: NURSE/HEALTHCARE 'ENCLAVES' ALSO EVIDENT

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3 HEALTHCARE ENCLAVES IN MORE DETAIL



**ALL EXTERNAL HEALTHCARE JOB FAMILIES:
A LOOK AT 3 DIFFERENT ZIP CODES (ALL OVER 1000)**

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INTERNAL WORKFORCE (SUPPLY)

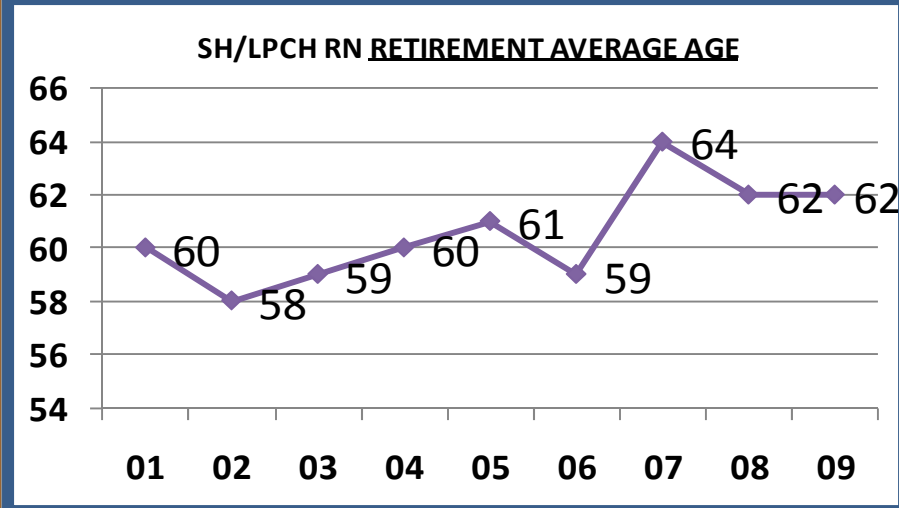
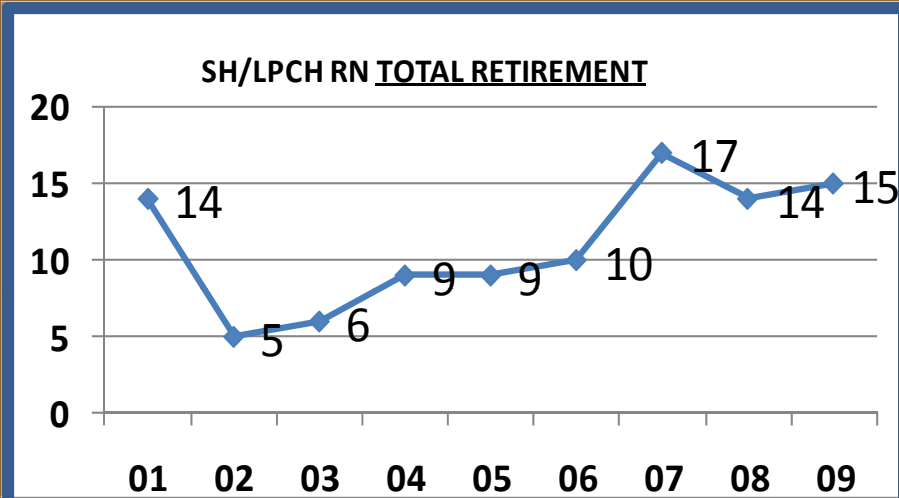
AS IT RELATES TO: AGING 'BABY BOOMERS'

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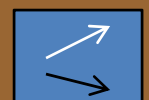


TOTAL NURSE RETIREMENT + AVERAGE RETIREMENT AGE.....BOTH ON THE RISE



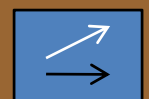
10 YEAR REVIEW

- Our total nurse retirement (volume) has been tracking exactly with average retirement age...
- ... As our number of nurses retiring has gone up (as it normally will a good economy), the retirement age also went up (???)
- One might think ...'as nurse retirees increased, that the average age would decrease inversely'



ANALYSIS AND FORECAST

- We believe this rise in average *retirement age* over the last decade was based upon the boomer retirement 'wave' beginning
- We predict that (perhaps obviously) our retirement age will soon plateau while total volume retiring will continue increasing



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TO BE MORE CONCLUSIVE WE STARTED LOOKING AT ACTUAL RN AGING DEMOGRAPHICS

- Both Hospitals RN's combined
- Three Age Groups Averaged by Zip

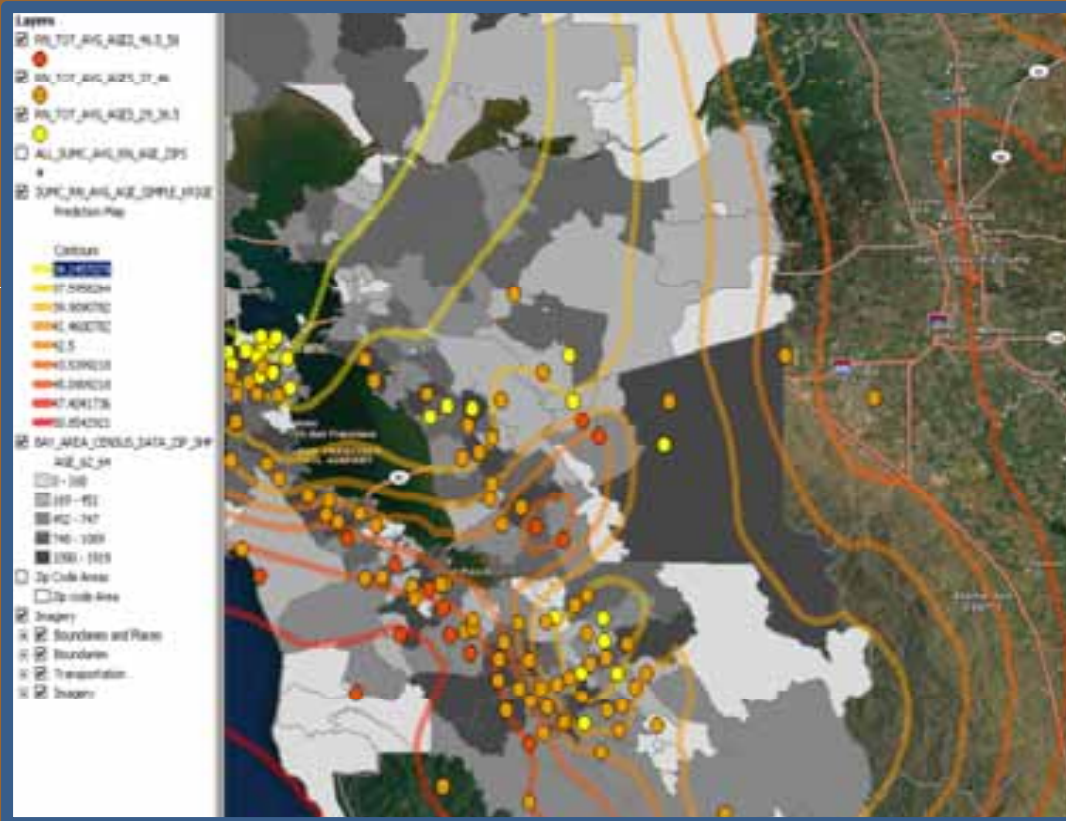
Yellow Dots = 29 - 36.5

Lt. Orange Dots = 37 - 46

Drk. Orange Dots = 46.5 - 56

- Simple - Kriged Prediction Map (Contoured)

- Under laid a Census map by Zip. Choropleths showing 'aging' areas (62-64 yr. olds households)



Shows predicted aging 'direction' from the Peninsula across the Dumbarton Bridge and into the East Bay... matching up with '12-Mile Effect', Job Codes and 'Enclaves'

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AGING RN'S PLUS RETIRED RN'S (10 YEAR PERIOD)



- ❑ Same RN age data and kriged prediction contours as previous slide but here, only the more senior group (Drk. Orange Dots 46.5 – 56) is turned on
- ❑ The twist here, is that the numbers in black actually represent retirements over the past 10 years which confirms further the 'direction' of aging and retirement movement eastward
- ❑ Hence, by subtracting actual ages from retirement on both the Peninsula and the East Bay we can predict that our current population of Experienced Nurses will be virtually depleted on the Peninsula in about 10 yrs. and in the East Bay (the largest Group) in about 15 yrs

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INTERNAL WORKFORCE (SUPPLY)

AS IT RELATES TO: 'EXITS'/TURNOVER

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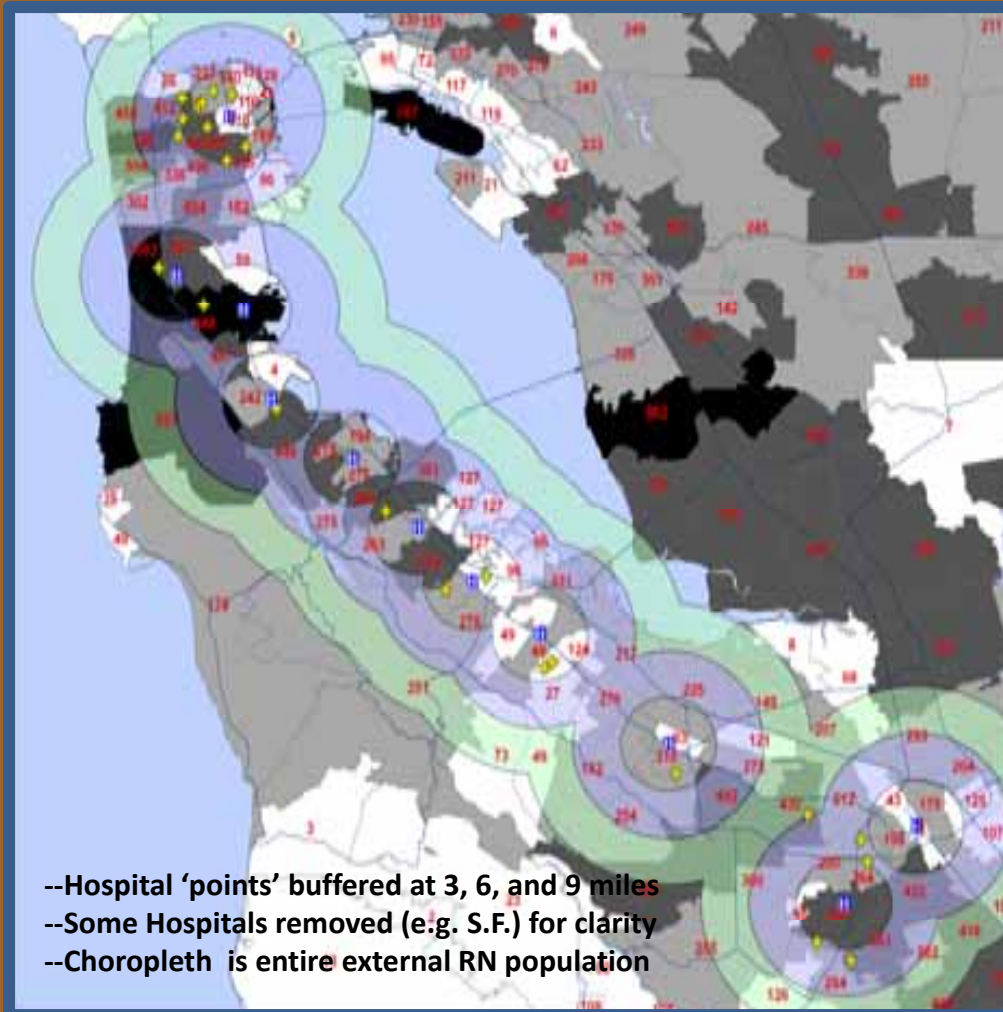


We've got Aging and Retirements ... but another startling fact, this time involving Voluntary Turnover...

Junior Nurses 'Leap Frog' up and down the Peninsula (confirming a hunch)

- ❑ Of the Nurses 'exiting' from both hospitals with less than 5-Yrs of Service, ~60% were between the ages of 20-39 yrs old and reside on the Peninsula
- ❑ We believe that these more 'junior' nurses actually 'leap frog' hospitals in pursuit of their perfect pay rate & shift (i.e. beginning 3rd Shift is common due to lack of Union seniority) as 'location' may not be as important as it may become in later years

This knowledge will assist us with recruiting, retention & emergency preparedness



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**EXTERNAL
SUPPLY/POPULATION**



**APPLICANT AVAILABILITY
AND LOCATION/FLOW**

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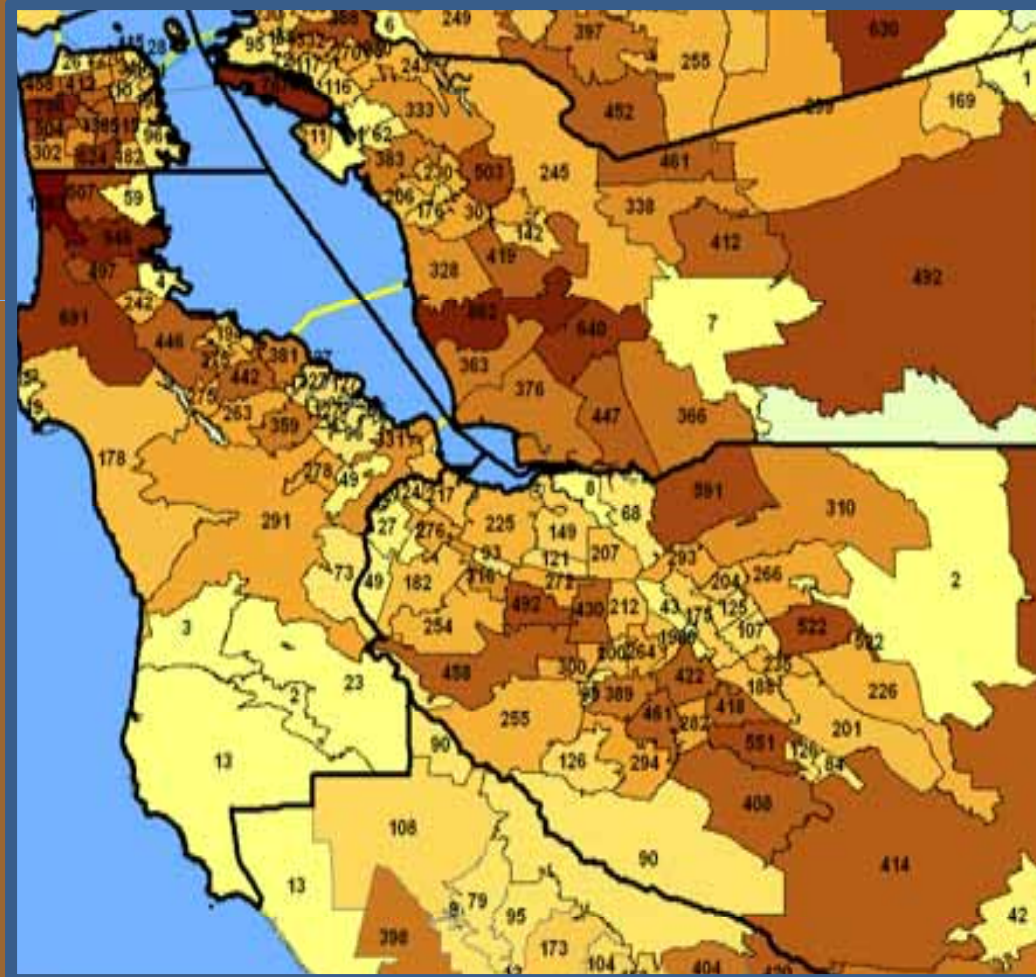
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ARE THERE ENOUGH RN'S? IS THERE A SHORTAGE IN THE BAY AREA? NO

Once and for all do we need to worry about a nurse shortage?

No



5- Counties:
with a total pop.
of approx. 5.7M

= 197 Zips

= 52,000 RNs

= 912 RNs per
100,000 pop.
in the 5-County
Bay Area!

Potential Active & Passive Candidates

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2004

2004 = Horizontal Blk. Lines



2005

2005 = Light Blue Shading



2006

2006 = Lime Green Outline



2007

2007 = Large Yellow Dot



2008

2008 = Red Stars



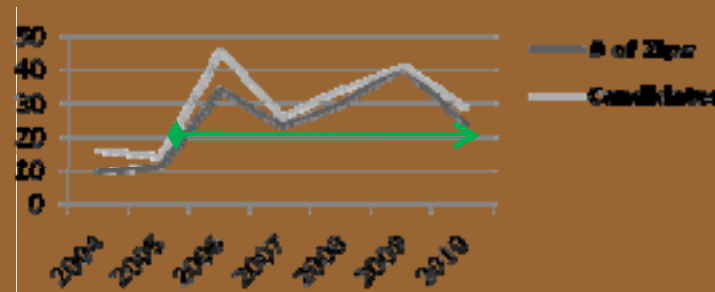
2009

2009 = Blue Diamonds



2010

2010 = Pink Shading



6 YEARS OF LOCATION BASED APPLICANT FLOW (SUPPLY) AS A DETERMINANT OF FUTURE DISPERSION

Staff Nurse II Applicants

■ **Trend:** Both the 'dispersion' of the Nurse Talent Pool and the volume of potential Nurse candidates (per sampled req.) has continued to increase across the Bay Area each year since '06, never dropping below 23 Zip Codes and 26 Candidates per Req. (Arrow) ... regardless of advertising!

■ **Intervening Variable?** While it is possible that both of these outward and upward functions result from general population growth/migration....

...it seems more likely that this 'oversupply' is a function of nurses entering the job market (increased supply) and some flattening (less demand) of hiring from local hospitals*

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EMERGENCY CONSIDERATIONS

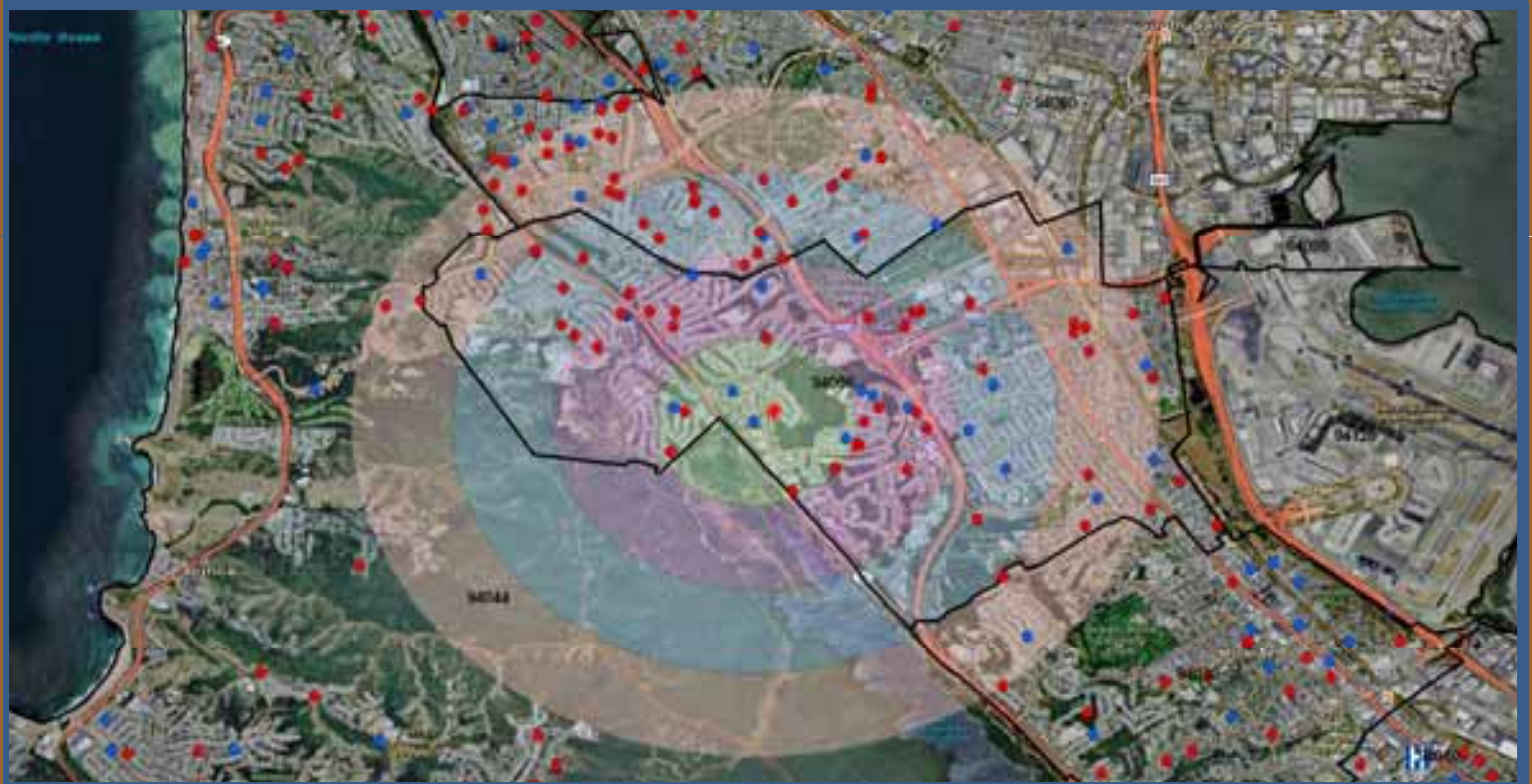
V.V THE WELL BEING OF OUR EMPLOYEES AND/OR 'SURGE' CONSIDERATIONS

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SAN BRUNO GAS LINE EXPLOSION SEPT. 10, 2010



We identified the cross streets, geocoded our employees and buffered the area in .5 mile increments (~10 minutes) and HR began calling to check on any potentially effected employees

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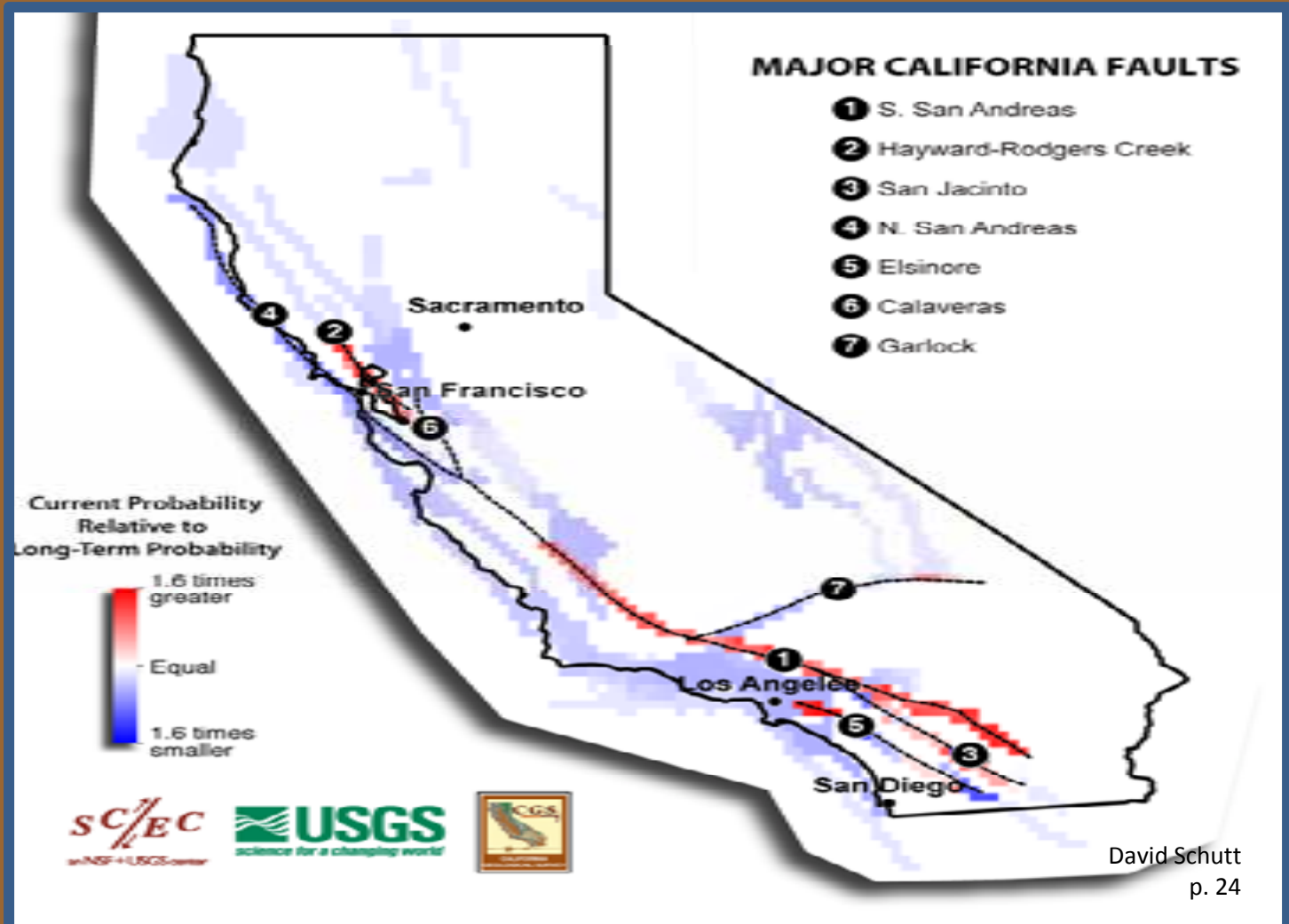
A LARGE NUMBER OF OUR WORKFORCE RESIDE ON OR NEAR THE HAYWARD RODGERS CREEK FAULTS

Uniform California Earthquake Rupture Forecast (UCERF)

A New Forecast of California Earthquakes from:

The 2007 Scientific Working Group on California Earthquake Probabilities (WGCEP 2007)

Faults with elevated probabilities for an earthquake include the S. San Andreas & Hayward Rodgers Creek Faults



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SUMMARY

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SUMMARY

- Knowledge of our overall Population, Clusters/Enclaves, Shifts and Commute Patterns; how can it help us to attract and retain employees?
- The Healthcare Workforce 12-Mile Effect; definite implications for Workforce Planning
- Peninsula and East Bay Boomer Aging and Retirement Trends (10-15 years out)
- How can we deal with the high cost of training and retraining the leap frogs?
- How can we use this new knowledge to better plan for emergencies That effect both our employees and surge planning?