Welcome to the Gateway Cities AQAP

Environmental Committee

September 28, 2011
Item VII A – The Gateway Cities AQAP Project Update

Environmental Committee
September 28, 2011
• AQAP 101 Review
• Schedule, Overall Status
• Participation Framework Status and Reviews
The AQAP was conceived in the I-710 EIR/EIS Process

I-710 EIR/EIS
Environmental Impact Report/Study for the I-710 corridor improvement project
Is for I-710 Corridor Only

AQAP
Develop a toolkit of AQ improvement strategies for the entire GCCOG
Is not a CEQA document
Is for the entire GCCOG
I-710 EIR/EIS and AQAP Scope of Work Relationship

**I-710 EIR/EIS**
- Technical Studies
- Noise
- AQ/HRA
- Comm. Impact Assessment
- and many more

**Gateway Cities AQAP**
- Emissions Inventory
- AQ/HRA
- Develop AQ Strategies
- Compendium Update
- CMNA
- I-710 HIA
- I-710 Construction Staging and Phasing
- I-710 Near Roadway Modeling (Ultrafines)
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*The AQAP tasks indicated are scheduled to be completed by the end of November for consideration in the Draft I-710 EIR/EIS*
Project Study Areas

I-710 Corridor

Gateway Cities
COG Subregion
Project Study Areas

**I-710 Corridor**
- I-710 EIR/EIS
  - Numerous Technical Studies (Noise, AQ/HRA)
- I-710 HIA
- I-710 Near Roadway Modeling (Ultrafines)
- I-710 Construction Staging and Phasing

**Gateway Cities COG Subregion**
- Emissions Inventory
- AQ/HRA
- New AQ Measures
- Compendium Update
- Community Medical Needs Assessment

Scheduled to be completed in time for consideration in the Draft I-710 EIR/EIS
AQAP Toolkit Development Process

- Compendium Update
- Early Actions

AQAP Toolkit Development

- AQ/HRA Protocol
- Emission Inventory
- AQ/HRA

AQ Strategies

- Hot Spot Assessment

Sources:
Traffic (includes I-710)
Industry
Rail
Ports
Powerplants etc.

Notes:
CSP - I-710 Construction Staging and Phasing
Ultra - Ultrafines Research
CMNA - Community Medical Needs Assessment
HIA - Health Impact Assessment
Note: Tasks shown in gold are scheduled to be completed in time for consideration in the I-710 EIR/EIS.
## AQAP Task Update

### Technical Tasks

<table>
<thead>
<tr>
<th>Task</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>Comm. Medical Needs Assessment</td>
<td>Final findings presented today</td>
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<tr>
<td>I-710 Near Roadway Modeling</td>
<td>Final findings presented today</td>
</tr>
<tr>
<td>I-710 Ultrafines</td>
<td>Final findings presented today</td>
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<tr>
<td>Air Quality Protocol</td>
<td>Completed</td>
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<tr>
<td>Compendium Update</td>
<td>Completed</td>
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<tr>
<td>Quantitative Air Quality Analysis</td>
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<td>I-710 Construction Staging and Phasing Assessment</td>
<td>Initial findings presented today. Final findings next month.</td>
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<tr>
<td>The I-710 Health Impact Assessment</td>
<td>Update presented today. Final findings next month.</td>
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<tr>
<td>Health Risk Assessment</td>
<td>In Process</td>
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<tr>
<td>Develop Air Quality Strategies</td>
<td>Task starts in 2012</td>
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<tr>
<td>Analysis of New Air Quality Measures</td>
<td>Task starts in 2012</td>
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<td>Early Action Support</td>
<td>Update presented today.</td>
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<tr>
<td>Develop AQAP Report</td>
<td>Task start in April 2012</td>
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<tr>
<td>Public Outreach</td>
<td>In Process</td>
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**The Gateway Cities Air Quality Action Plan**

**Draft**
AQAP Project Overview Schedule
AQAP Task Updates
I-710 Health Impact Assessment

- Conducted 3rd HIA TWG
- Draft Scope Considered during July and August Roundtables, Updates to EC, Trans. Comm, and COG BOD
- Final Scope of Work Completed
- Draft Report under review
- Final findings to be presented to RTs, EC, TC and BOD in Oct/Nov
Early Action Items for Local Gov’t

- Completed evaluation of status of Early Action Items
- Initiated Research on remaining Early Action Implementation.
- Conducted Workshop with PDs and PWs
- Initial Findings in January
Impacts from I-710 Construction Staging and Phasing

- Modeling near complete
- Updating model with revised population data for construction equipment (age, hp, qty.) from CARB
- Discussed Key Findings at September Roundtables
- Initial Results today, then Trans. Comm. and GCCOG BOD in October
Objectives

Estimate emissions for a reasonable foreseeable concept of construction staging and phasing of the I-710 corridor improvements

• Duration of Project (2018 – 2034) = 17 years
• Actual duration dependent on funding
1. Use construction data from GCCOG Construction Staging/Phasing concept report for each segment
   a. Area disturbed, project length and/or area, project duration, soil hauling, acres disturbed per day,
   b. Duration of each stage and phase within segment
2. Input construction data into the enhanced Roadway Construction Emissions Model
3. Output daily and monthly average and peak daily emissions on a month by month basis for each of seven construction segments
Preliminary Findings

Peak PM10 Emissions (lbs/day)

Peak PM$_{10}$ Daily Emissions for Any One Segment

Most PM10 generated from construction fugitive dust
Preliminary Findings Continued

NOx, PM10 and PM2.5

• Only segments 3-7 show exceedance of regional significance threshold, but only 10-20% of the construction period

• Analysis is developed for each segment and changes at the local scale (geometry, interchanges) will not impact the emission findings

Robust analysis is useful for air quality modeling

• Detailed info for specific times and locations for each pollutant of concern
Next Steps

• Updating now with revised CARB OFFROAD model information (received August 2011)
  • Update primarily to equipment population and load factors
• Health risk of the toxics addressed in HRA
Participation Framework Status and Reviews
Environmental Committee
September 28, 2011
Participation Framework

October
• I-710 HIA Draft Findings & Recommendations

I-710 Project Team

GCCOG Board
October 5th

Transportation Committee
October 5th
November 2nd

Environmental Committee
September 28th
October 26th

AQAP Roundtables

AQAP Technical Working Groups

I-710 HIA September 26th & October 3rd

September 10th Technical Webinar
September 14th /15th Roundtable Meetings
October 12/13 Roundtable Meetings

October 24th SPECIAL ROUNDTABLE MEETING
Participation Framework

I-710 Project Team

GCCOOG Board

I-710 Related Elements

Transportation Committee

Environmental Committee

AQAP Roundtables

October 12/13 Roundtable Meetings

October 24th SPECIAL ROUNDTABLE MEETING

AQAP Technical Working Groups

I-710 HIA TWG

October 3rd

November 2nd

October 26th
AQAP Participation Framework
I-710 HIA TWG Update

HIA Report: Overview and Draft Chapters:

- Mobility
- Air Quality
- Traffic Safety
- Neighborhood Resources
- Jobs and Economic Development
- Noise

Meetings:
May 12th, May 26th, July 11th, August 29th, September 26th, October 3rd
Participation Framework

- AQAP Technical Working Groups
  - I-710 HIA TWG October 3rd

- AQAP Roundtables
  - October 12/13 Roundtable Meetings

- I-710 Project Committee
  - I-710 Related Elements

- Transportation Committee

- GCCOG Board

- Environmental Committee
  - November 2nd

- October 26th
  - I-710 HIA TWG October 3rd

- October 24th
  - SPECIAL ROUNDTABLE MEETING
• TRT Meeting Agenda Overview
  o I-710 Near-Roadway Modeling Final Report Findings
  o I-710 Ultrafines Final Report Findings
  o I-710 Construction Staging Emissions Presentation and Discussion
  o I-710 HIA Noise Chapter and Status Report Presentation

• Roundtable Discussion
  o I-710 HIA – Noise Chapter

• September 14th Meeting
I-710 Construction Phasing and Staging Emissions Report Findings:

**Comment:** TRT Members noted that concrete may pile up at the work site; if the concrete is not covered, it could produce a significant amount of dust. They asked if projections of the PM 10 & 2.5 emissions include fugitive dust from construction debris?

**Response:** Studies have shown fugitive dust can be reduced by 50% when watered every four (4) hours and up to 74% when watered every two (2) hours. Surfactants such as calcium chloride that when applied to fine dirt bonds with the soil and prevents it from becoming airborne when blown by the wind.
I-710 Near-Roadway Monitored to Modeling Final Comparison Report Findings:

**Comment:** TRT Members were dismayed to learn that the final product that will be submitted to the I-710 EIR/EIS would be in the form of a PowerPoint.

**Response:** Project Team noted that the full detailed I-710 related reports will not be available until February 2012. The four technical tasks that will be submitted to Caltrans go above and beyond what is already included in the I-710 EIR/EIS.
Ultrafine Particles Near Roadways, Final Report Findings:

Comment: TRT Members asked for more detail on the recommendation for local governments to restrict their transportation fleet.

Response: ICF Consultant Ed Carr noted that the regulation could be in two parts: first, local agencies could restrict where and how much "dirty vehicles" can travel. While this is not a current power of local governments, it could be explored for the future. Second, municipalities and other agencies could adopt low emission vehicle standards for their own fleets.
Participation Framework

- I-710 Project Team
- GCCOG Board
- Transportation Committee
- Environmental Committee
- AQAP Roundtables
- AQAP Technical Working Groups

- I-710 Related Elements
- October 12/13 Roundtable Meetings
- October 24th SPECIAL ROUNDTABLE MEETING
- I-710 HIA TWG October 3rd
- November 2nd
• AQAP Project Update
  o I-710 Near-Roadway Modeling Final Report Findings
  o I-710 Ultrafines Final Report Findings
  o I-710 Construction Staging Emissions Presentation and Discussion
  o I-710 HIA Noise Chapter and Status Report Presentation

• Roundtable Discussion
  o I-710 HIA – Noise Chapter

• September 15th Meeting
I-710 HIA Noise Chapter

Clarifying Question: How much of the I-710 freeway is flanked by soundwalls? Recommend placing a land use layer on the GIS map containing the Caltrans noise level measurements.

Response: Metro is funding a noise study to see what areas are missing soundwalls and the feasibility of building them.

Clarifying Question: Noise mitigation techniques as a proposed solution (slide 28).

Response: Further research is needed.
**Comment:** Since mitigation measures are based on the numbers collected, we need to be very sure that they are accurate. Recommend additional sampling at sensitive receptor sites; the study should consult a sound engineer to determine how far out to collect data.

**Comment:** Importance of matching the sensitive receptor sites to the mitigation priorities. Example: Don’t build a sound wall next to an industrial zone! Build it next to a residential area with a neighborhood school.
Comment: ART member recommended a peer review of the methodology used to predict emissions because the projections will be considered by Caltrans as a basis for policy decision making.

Response: Project Team will discuss this recommendation with Caltrans.
Ultrafine Particles Near Roadways:

**Clarifying Question:** What is the most effective way to reduce emissions?

**Response:** Diesel particulate traps are the best technology for reducing the emission of ultrafine particles. When used in conjunction with oxidation techniques, they are even more effective.

**Clarifying Question:** Does the danger of ultrafines come from their small size or their chemical composition?

**Response:** High surface area characteristic of ultrafine particles is also a source of toxicity.
Participation Framework

I-710 Project Team

GCCOG Board

I-710 Related Elements

Transportation Committee

Environmental Committee

October 12/13 Roundtable Meetings

October 24th SPECIAL ROUNDTABLE MEETING

I-710 HIA TWG October 3rd

AQAP Roundtables

AQAP Technical Working Groups

November 2nd

November 2nd

October 26th
Comment: Several ART Members expressed concerns expressed about fiscal impacts and the medical cost for each premature death.

Motion Passed Unanimously: Project Team is to further study the fiscal impacts related to the health outcomes.

Response: Jerry Wood on behalf of Gateway Cities indicated that the Project Team would conduct research on the matter and report back at the September meeting.
Thank You

Questions or Comments
I-710 Near Roadway Monitored to Modeled Comparison Methodology

Environmental Committee

September 28, 2011

This AQAP study is not part of the I-710 Corridor Project studies, but upon completion, it will be submitted to Caltrans for review and consideration for use in preparing the I-710 Corridor Project EIR/EIS.
Outline for Presentation

Objectives of the analysis

Methodology

Findings

Next Steps
Assess the representativeness of the I-710 EIR/EIS modeling near-roadway concentrations by:

- Comparing with the monitored data as used in air quality and exposure assessments
Modeling Methodology

AERMOD – Air Dispersion Model (same as I-710 EIR/EIS)

- Key inputs: hourly emissions and local meteorology
- Model is only as good as inputs

Adjustments to I-710 EIR/EIS modeling:

- Hourly meteorological data for 2009 was obtained from SCAQMD and AERMOD input files were prepared
- Truck emissions were adjusted to 2009 levels based on monthly TEU activity relative to 2008
- Model receptors at SCAQMD at monitoring sites
I-710 EIR/EIS Near Roadway Modeling

- Three sets of receptor grids
  - 100m spacing within 500 m of I-710
  - 250 m spacing within 2,500 m of I-710
  - 500 m spacing within 5,000 m of I-710
- Considered appropriate scale for near-roadway modeling assessment for the I-710 EIR/EIS as requested by the CAC and the PC
Near-Roadway Concentrations Comparison Methodology

Separate comparison for two near-roadway monitoring sites (15m and 80m)
Separate comparison for both NO\textsubscript{x} and CO
  • Insights on inputs and model performance
  • Different source mix for NO\textsubscript{x} and CO
Graphical and statistical comparison
  • Scatter plots modeled vs. observed concentrations for: intra-day periods, winter/summer and two monitoring sites
  • Correlation coefficients – measure of scatter
• CO is generally under-predicted by the model.
• CO is primarily associated with gasoline vehicle emissions.

Under-predictions likely attributed to: hourly traffic volumes, fraction of HHDDT and cars.
Scatter Plots of Modeled versus Monitored NO$_x$ (ppb) (paired in time and space)

NO$_x$ is generally over-predicted in the summer and underpredicted in winter.

Uncertainty in truck volumes and their speed profiles
Monitor to Model data is similar to other studies:

In an NCHRP study, two models HYROAD and CAL3QHC also had similar scatter for in comparison with monitored CO data.
Key Findings

- In general, model under-predicts CO and over-predicts NOx concentrations.

- Correlation is generally poor between data paired in time and space for predicted and observed concentrations.

- Discrepancies likely from uncertainties in traffic volumes and mix of vehicles and to a lesser degree meteorology.
Possible Next Steps

Present model comparison and discuss uncertainties in model

- On-site speed profile vs. average speed “driving cycle”
- Actual fleet mix (trucks/cars) vs. average weekday fleet
- Actual meteorology vs. N. Long Beach meteorology

Compare with similar type studies

Install permanent monitoring stations along the I-710 as an early action project (traffic volume, met and air quality)

Sensitivity studies on temporal traffic activity profile
Weight in Motion Hourly Profile versus Constant Volume with intra-day Periods
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Outline

Objectives of the study

Literature review

Synthesis of the findings

Conclusions
Objectives

Perform a literature review on ultrafine particles with emphasis on latest understanding and findings on:

• Characteristics
• Measurements techniques
• Emissions and atmospheric processing
• Monitoring studies in LA basin
• Current and future regulation

100+ articles reviewed; interviews with EPA, CARB, SCAQMD
Ultrafine Particles

General accepted definition: Particles less than 100 nm (0.1µm) in size

- Particles are not always spherical
- Diameter of a sphere with “equivalent” mobility
Ultrafine Particles

Smaller particles have higher probability of depositing in lower parts of the lung and entering bloodstream – linked to respiratory and cardiovascular diseases.

Particles are so small have little mass compared to larger particles – measure as number of particles per unit volume.

Characterized by shape, structure, chemical composition, toxicity.
Urban environments contain elevated levels of ultrafine particles. Typical concentrations in various environments are as below in $10^3$ Particles/cm$^3$:
Ultrafine Particles: Emissions

Emissions depend upon vehicle type, vehicle age, fuel type and composition, control technologies, vehicle speed, engine load, and road conditions.

On a per mile basis heavy-duty diesel trucks emit significantly higher levels of ultrafine particles than light-duty gasoline vehicles.

Ultrafine emission factors are not well characterized for vehicles.
Ultrafine Particles: Near-Roadway Environment

Tailpipe - major sources of ultrafine particles in urban environment.

Particle number concentration are significantly elevated in near-roadway environments.

Concentration drops exponentially in the downwind distance from the roadway:
- Reaches background levels within 500m in clean environment
- Sooner in urban environment – typically 200-300 m
Ultrafine Particles: LA Region

Numerous studies have shown significantly elevated levels of UFP near LA freeways.

Sites near I-710 showed higher concentrations than I-405.

Most communities have at least typical urban “background” concentrations.

Winter concentrations are generally higher than those in summer (Huda, et al. 2010).
Ultrafine Particles: Exposure in LA region

Two major populations exposed to ultrafine particles in near-roadway environment:

**Residents in the vicinity of freeways:**
- Particles can penetrate efficiently into residences downwind near freeways – natural ventilation

**Commuters/drivers on the freeways:**
- UFP penetrate efficiently into vehicles Zhu et al. (2008) found
  - High (nearly full) penetration of UFP unless recirculation then about half.
Ultrafine Particles: Regulations

Currently no ambient standards for number concentration anywhere in the world.

- EU recently adopted a tailpipe emissions standard for light duty diesel
- EPA reviewed testing protocol, but found not satisfactory for US due to the exclusion of volatile (gas-phase) material
Ultrafine Particles: Regulations

**EPA** - no immediate plans of regulation—continue with mass based std to reduce UFP, but continued priority research

**CARB** had planned regulations similar to that of EU for SULEV gasoline vehicles under upcoming LEV III standards

- standardized testing procedures need to be developed
- no plans heavy-duty diesel (DPF deemed best avail)
Ultrafine Particles: Regulations

**SCAQMD** taking steps to characterize the level of ultrafine particles in LA region

- MATES-IV study currently planning stage is underway with emphasis on UFP

**Local agencies** lack the authority to set either tailpipe or ambient standards

- Incentives for clean vehicles (zero emissions vehicles do not emit UFP)
This AQAP study is not part of the I-710 Corridor Project studies, but upon completion, it will be submitted to Caltrans for review and consideration for use in preparing the I-710 Corridor Project EIR/EIS.
Protocol Development Process

Characterizes Health Conditions/Treatment by reviewing data re:

- Disease outcomes
- Health resources available
- The effectiveness of existing medical care

Uses data from:

- Los Angeles County Department of Public Health (LACDPH):
  - Los Angeles County Health Survey (2007)
  - Mortality in Los Angeles County (2007)
- Office of Statewide Health Planning and Development (OSHPD):
  - Hospitalization and Emergency Department Visit Data (2009)
  - Shortage Designation Data (2010)
- California Health Interview Survey (CHIS) (2009)
- U.S. Census Bureau
Geographies: Health Districts

Gateway Cities

Health District Boundary

Cities by Health District

Belflower (HD 6)
Artesia
Bellflower
Cerritos
Hawaiian Gardens
Lakewood
Norwalk
Signal Hill
Compton (HD 12)
Compton
Lynwood
Paramount
East LA (HD 16)
Commerce
Montebello
Harbor (HD 31)

Long Beach (HD 40)

Long Beach
San Antonio (HD 58)
Bell
Bell Gardens
Cudahy
Downey
Huntington Park
Maywood
South Gate
Vernon
Whittier (HD 91)

La Habra Heights
La Mirada
Pico Rivera
Santa Fe Springs
Whittier

Health, Medical Need, & Quality of Life (I)

- Chronic and acute health problems have an impact on quality of life and long-term health. Struggling with poor health increases vulnerability to exposure to adverse environmental, social, economic, and political conditions and circumstances.

- Prevalence of diseases or negative health conditions is rarely distributed evenly amongst a population. Certain communities may have a higher risk for disease outcomes due to a variety of factors including income, housing adequacy, access to medical care, stable health insurance, nutrition, employment conditions, parenting resources, neighborhood environmental quality, and community violence and stress.

- Patterns of health and disease outcomes often reflect patterns of social and economic circumstances.
• For individuals, income is one of the strongest and most consistent predictors of health and disease in the public health research literature.

• Individuals who live in poor, disadvantaged neighborhoods have inferior health outcomes.

• Research has found that access to primary care can partially mitigate the negative effects of lower socio-economic status (SES) and income inequality on health.

• Access to health services including preventive care, primary care, and tertiary care often depends on whether a person has health insurance.
• 12 of the 26 Gateway Cities have a higher percentage of individuals living below the poverty level than in Los Angeles County overall.

• \( \frac{1}{2} \) of the Gateway Cities are considered to have higher percentages of severe overcrowding (1.51 or more occupants per room) than are found in the county overall. More than 17% of housing units in Huntington Park are considered to be severely overcrowded, the highest percentage in the study area.
Examples of Findings in the CMNA

- Self-reported health status
- Prevalence of children with asthma
- Asthma hospitalization rates
- Cardiovascular disease emergency department visit rates
- Heart attack hospitalization rates
- Adults who meet physical activity guidelines
- Depression-related hospitalization rates
- Leading causes of death
- Primary care health professional shortage areas
- Mental health professional shortage areas
- Medically underserved populations
Prevalence of Children with Asthma

[Bar chart showing percent of children with asthma in different health districts: Bellflower 8.8%, Compton 11.3%, East LA 7.0%, Long Beach 10.6%, San Antonio 8.1%, Whittier 11.2% compared to LA County.]
Asthma Hospitalization Rates

- Bellflower
- Compton
- East LA*
- Long Beach
- San Antonio
- Whittier

Legend:
- Orange: Non-Hispanic White
- Green: Non-Hispanic Black
- Red: Hispanic
- Dashed Green: LA County Non-Hispanic White
- Light Orange: LA County Non-Hispanic Black
- Light Red: LA County Hispanic
cardiovascular disease emergency department visit rates
Heart Attack Hospitalization Rates
Percent of Adults who Meet Physical Activity Guidelines
Rates of Hospitalizations Related to Depression
Leading Causes of Death

<table>
<thead>
<tr>
<th>#1 cause of deaths</th>
<th>LA County</th>
<th>Bellflower (HD 6)</th>
<th>Compton (HD 12)</th>
<th>East LA (HD 16)</th>
<th>Long Beach (HD 40)</th>
<th>San Antonio (HD 58)</th>
<th>Whittier (HD 91)</th>
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<tr>
<td>Coronary Heart Disease</td>
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<td>#2 cause of deaths</td>
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<td>Emphysema / COPD</td>
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<td>Emphysema / COPD</td>
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<td>Lung Cancer</td>
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<td>Lung Cancer</td>
<td>Diabetes</td>
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Source: Mortality in Los Angeles County 2007, Los Angeles County Department of Public Health.
Primary Care Health Professional Shortage Areas
Mental Health Professional Shortage Areas
Recommendations

• Convene a Health Working Group
  • Goals: understand and address some specific conditions that contribute to poor health and lack of access to medical care on west side of Gateway Cities
  • Participants: public agencies, researchers, community members, health organizations, decision makers
  • Develop a policy and program agenda: health insurance, attracting doctors to areas in need, addressing root causes of chronic disease, addressing health disparities
• Routinely update and monitor data collected in the CMNA
• Address ideas to increase medical health facilities on the west side of Gateway Cities
Conclusions

• Overall, Gateway Cities residents have slightly higher incidence of health issues compared to the rest of the county, but it is not significant.
• Non-Hispanic white and black residents have higher incidence of health problems associated with asthma and heart conditions than Hispanic residents
• Primary care facilities appear to be generally adequate except for the areas bordering the west side of Gateway Cities.
• The medically underserved areas in Gateway cities also border the west side of the region.