

Alameda County Public Health Department Adult Preventable Hospitalizations:

Examining Impacts, Trends, and Disparities by Group

Abstract

Preventable hospitalizations occur when persons are hospitalized for a medical condition that could have been avoided had they received sufficient, high quality primary and preventative outpatient care earlier. Preventable hospitalizations are measured with prevention quality indicators (PQIs) which, for adults, include 13 condition-specific indicators and three composite (summary) indicators. For adults in Alameda County, one out of every ten hospitalizations is likely preventable, and two-thirds of these are for chronic conditions. Annual costs of preventable hospitalizations for adults in Alameda County exceed \$150 million, and nearly 80% of costs are paid for by public payers including Medicare and Medi-Cal. Rates of composite indicators for overall, chronic, and acute preventable hospitalizations decreased from 2001 to 2011, but rates of several condition-specific indicators were steady or increased during this time. Large differences in adult preventable hospitalization rates are seen by age, race/ethnicity, and city/place: adults over 74 years old have the highest burden of preventable hospitalizations in Alameda County, as do African Americans and those living in Hayward and Oakland. In the wake of the nation's move toward improving healthcare access and quality under the Affordable Care Act, monitoring preventable hospitalizations at the local level and being able to weigh into the national conversation may be a timely and relevant effort.

Preventable Hospitalizations

One out of every ten hospitalizations in Alameda County, and throughout California, is likely prevent-

able. Preventable hospitalizations occur when persons are hospitalized for a medical condition that could have been avoided had they received sufficient, high quality primary and preventative outpatient care earlier. For example, many patients hospitalized for asthma could have avoided such hospitalization had they received adequate education, medication, or monitoring in the outpatient setting. Not only can hospitalizations be invasive and burdensome to patients, but hospital care requires greater resources and costs than outpatient care. By looking at the burden of preventable hospitalizations among different patient subpopulations, policymakers and providers can identify those communities most in need of improvements in outpatient care, and target the conditions for which care is most needed. In the wake of the nation's move toward improving healthcare access and quality under the Affordable Care Act, monitoring preventable hospitalizations at the local level and being able to weigh into the national conversation may be a timely and relevant effort.

Measuring Preventable Hospitalizations

Prevention Quality Indicators (PQIs) were developed by the US Agency for Healthcare Research and Quality (AHRQ) to measure how well populations have access to quality primary and preventative outpatient care.¹ There are six PQIs for children and 16 for adults. PQIs are based on hospital discharge data, and rates are adjusted for age and gender.

This brief will focus on the 16 adult PQIs, which include 13 condition-specific indicators (nine for chronic conditions and four for acute conditions) and three composite indicators. Chronic indicators include diabetes,



Table 1: Preventable Hospitalizations, Adults

PQI	Number of Hospitalizations	Rate of Hospitalizations per 100,000*
PQI #8 Heart Failure	2,976	304.1
PQI #5 COPD or Asthma in Older Adults (Ages 40+)	2,072	326.9
PQI #11 Bacterial Pneumonia	1,703	168.7
PQI #12 Urinary Tract Infection	1,334	133.1
PQI #3 Diabetes Long-Term Complications	1,104	102.0
PQI #10 Dehydration	683	66.7
PQI #1 Diabetes Short-term Complications	598	50.4
PQI #2 Perforated Appendix*	297	26.2
PQI #7 Hypertension	278	25.8
PQI #15 Asthma in Younger Adults (Ages 18 - 39)	172	35.9
PQI #13 Angina Without Procedure	164	15.1
PQI #16 Lower-Extremity Amputation among Patients with Diabetes	149	14.1
PQI #14 Uncontrolled Diabetes	81	7.2
PQI #92 Chronic Composite	7,528	725.7
PQI #91 Acute Composite	3,720	368.0
PQI #90 Overall Composite	11,248	1,095.6

Source: OSHPD PDD Data, 2012.

Note: * PQI #2 Perforated Appendix is per 100 appendicitis cases.

respiratory, and circulatory system related preventable hospitalizations. Acute indicators include bacterial pneumonia, urinary tract infection, perforated appendix, and dehydration preventable hospitalizations. The three composite indicators serve as summary measures, and include a chronic composite, an acute composite, and an overall composite. Table 1 displays the 16 indicators for adults, associated frequencies, and age and sex adjusted rates for Alameda County in 2012.

Additional factors beyond access to quality outpatient care could also affect PQI rates.² These factors may include environmental conditions such as air quality, patient adherence to treatment recommendations, and social factors such as income, education, language proficiency, and chronic stress. Further research is needed to understand the impact of these and other factors on PQI rates.

Impacts of Preventable Hospitalizations and Major Drivers

Ten percent of hospitalizations in Alameda County, and throughout California, are likely preventable. About two-thirds of these are for chronic conditions, and the remaining one-third are for acute conditions. The most frequently occurring adult preventable hospitalizations in Alameda County (and statewide) are for heart failure (PQI #8), chronic obstructive pulmonary disease (COPD) or asthma in older adults (PQI #5), and bacterial pneumonia (PQI #11). These three make up nearly 60% of all adult preventable hospitalizations in Alameda County (Table 1).

Adult preventable hospitalization costs in Alameda County exceeded \$150 million in 2012, and over 60% of these costs were from the three most frequent PQIs. The average cost for a single preventable hospitalization ranged from \$9,000 to \$53,000, the most costly for diabetes-related lower-extremity amputations (Table 2).



Table 2: Preventable Hospitalization Costs, Adults

PQI	Number of Hospitalizations	Mean Cost per Discharge	Estimated Cost
PQI #8 Heart Failure	2,976	\$18,334	\$40,004,354
PQI #5 COPD or Asthma in Older Adults (Ages 40+)	2,072	\$17,370	\$29,581,332
PQI #11 Bacterial Pneumonia	1,703	\$17,685	\$24,741,044
PQI #3 Diabetes Long-Term Complications	1,104	\$20,857	\$17,040,363
PQI #12 Urinary Tract Infection	1,334	\$12,759	\$14,609,421
PQI #10 Dehydration	683	\$12,121	\$6,993,722
PQI #1 Diabetes Short-term Complications	598	\$13,257	\$5,939,177
PQI #2 Perforated Appendix	297	\$24,499	\$4,973,394
PQI #16 Lower-Extremity Amputation Among Patients with Diabetes	149	\$53,062	\$4,563,347
PQI #7 Hypertension	278	\$11,241	\$2,709,064
PQI #15 Asthma in Younger Adults (Ages 18 - 39)	172	\$8,933	\$1,313,099
PQI #13 Angina Without Procedure	164	\$7,773	\$855,072
PQI #14 Uncontrolled Diabetes	81	\$9,763	\$771,287
Total	11,248	\$16,617	\$154,094,676

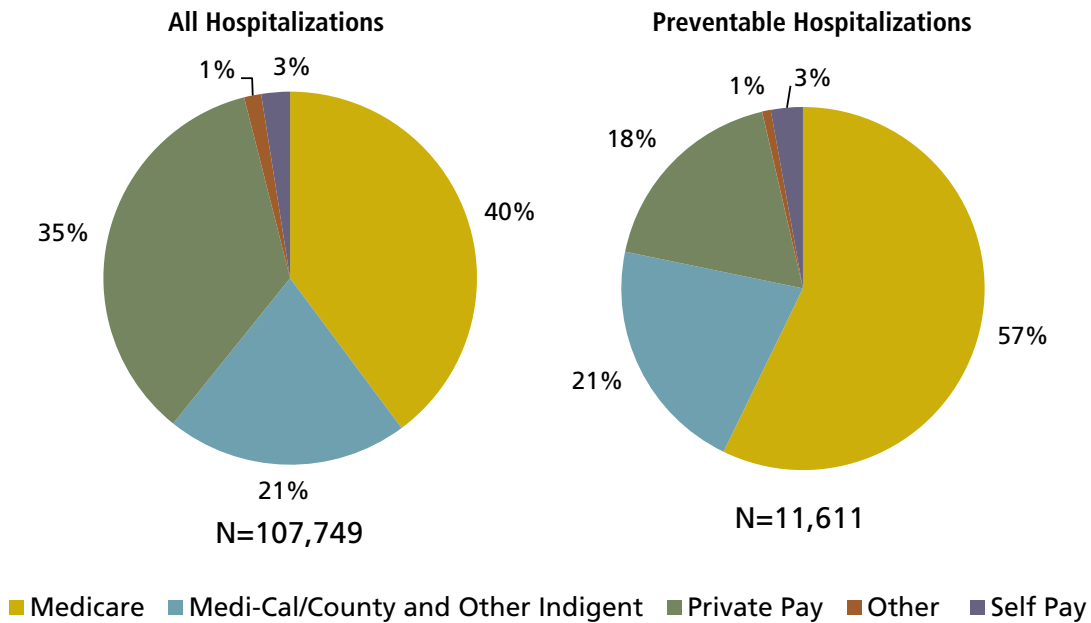
Source: OSHPD PDD Data, 2012.

Note: Based on estimated cost to charge ratio of 0.2598, OSHPD 2008.

In addition to diverting hospital resources from other needed areas, preventable hospitalizations disproportionately burden public payers. Nearly 80% of all preventable hospitalizations are paid for by public

payers including Medicare, Medi-Cal, county indigent programs, and other indigent programs, compared to about 60% of total (including non-preventable) hospitalizations. Private insurers pay for about 18% of all

Figure 1: Payer Source, Adults



Source: OSHPD PDD Data, 2012.



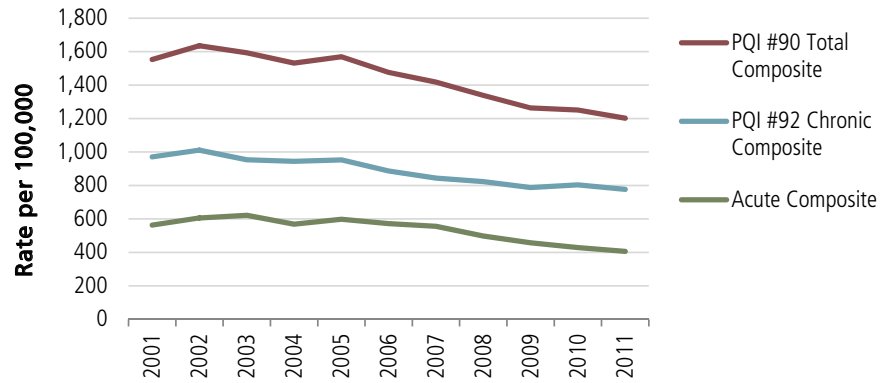
preventable hospitalizations while 3% are paid by patients themselves (Figure 1).

Trends

Rates for total hospitalizations (including those which are not preventable) decreased in Alameda County from 2001 to 2011. Likewise, for preventable hospitalizations, rates for all three summary measures (the overall, acute, and chronic composites) decreased over that time period (Figure 2). For condition-specific PQI measures, preventable hospitalization rates decreased from 2001 to 2011 for COPD or asthma in older adults (PQI #5), heart failure (PQI #8), dehydration (PQI #10), bacterial pneumonia (PQI #11), angina without procedure (PQI #13), and lower extremity amputation among patients with diabetes (PQI #16) (Figure 3). Preventable hospitalization rates with more variable patterns over this period were for perforated appendix (PQI #2), diabetes long-term complications (PQI #3), uncontrolled diabetes (PQI #14), and asthma in younger adults (PQI #15) (data not shown).

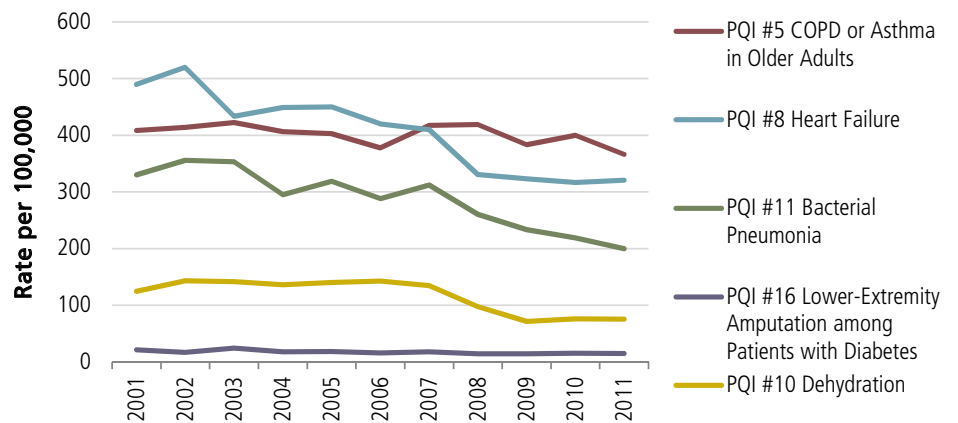
Importantly, preventable hospitalization rates increased over the same period for short-term diabetes complications (PQI #1), hypertension (PQI #7), and urinary tract infection (PQI #11) (Figure 4).

Figure 2: Overall, Chronic, and Acute Composite Measures, Adults



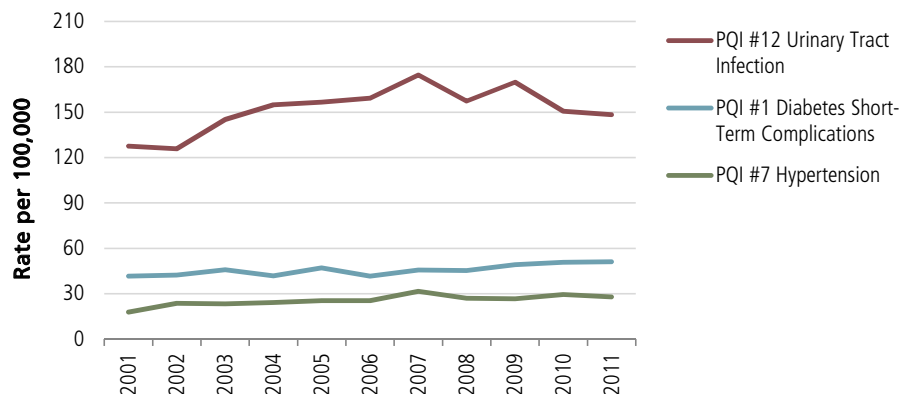
Source: OSHPD PDD Data, 2001-2011.

Figure 3: Adult Preventable Hospitalization Indicators with Decreasing Rates



Source: OSHPD PDD Data, 2001-2011.

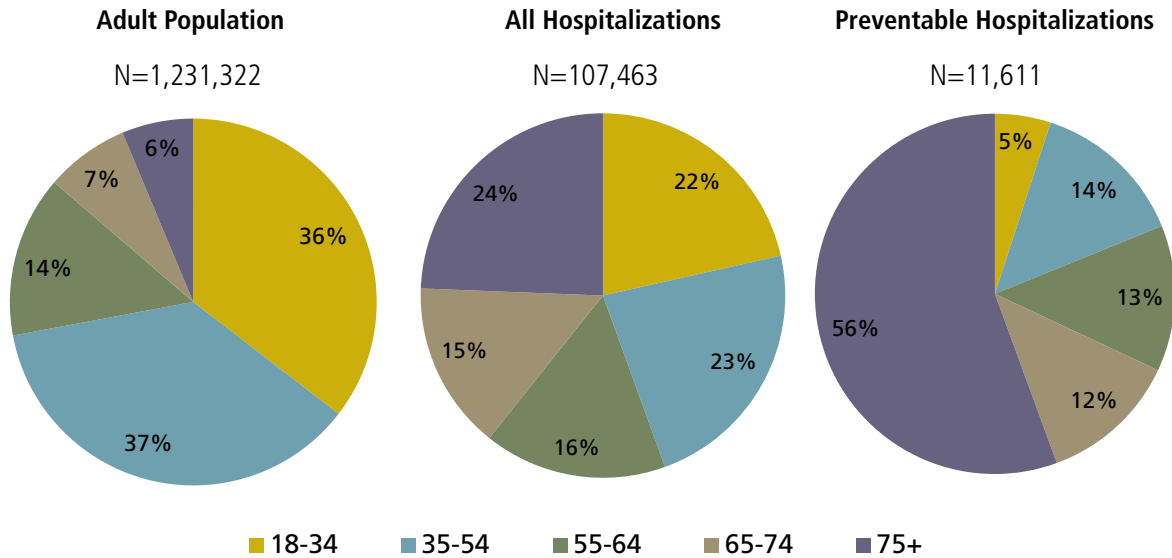
Figure 4: Adult Preventable Hospitalization Indicators with Increasing Rates



Source: OSHPD PDD Data, 2001-2011.



Figure 5: Age Distribution, Adults



Source: OSHPD PDD Data, 2012, Census 2010.

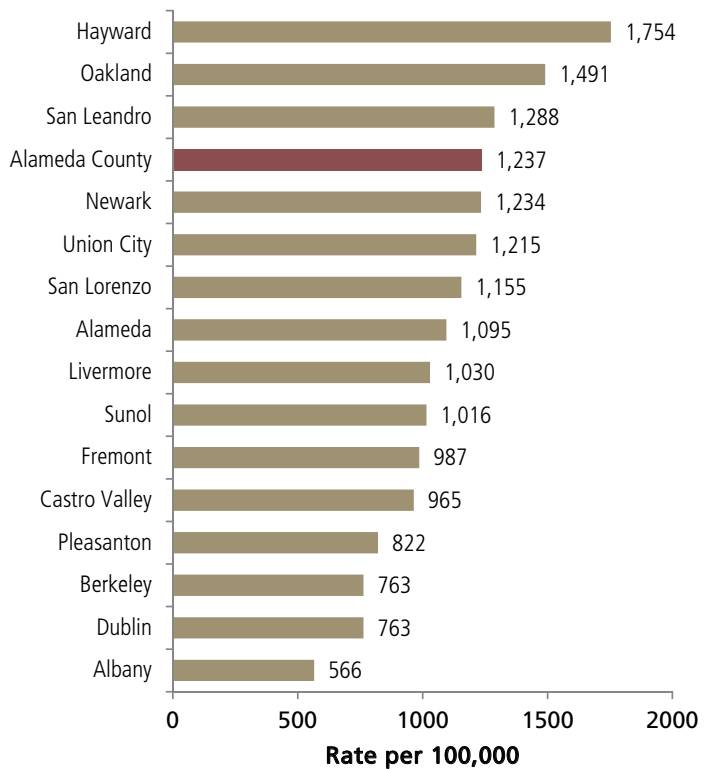
Preventable Hospitalizations by Age

Adults in every age group are impacted by preventable hospitalizations. However, the majority, 68%, are occur among those 65 years and older. Adults 75 years and older are especially burdened by preventable hospitalizations. While they only make up 6% of the total population and represent 24% of all hospitalizations, they represent 56% of all preventable hospitalizations (Figure 5).

Preventable Hospitalizations by Place

Hayward had the highest composite preventable hospitalization rate in Alameda County from 2009-2011; it was 1,754 hospitalizations per 100,000 population, 40% higher than the background county rate. Oakland and San Leandro also had rates higher than the county rate, whereas Albany had the lowest

Figure 6: PQI #90 Total Composite Adult Preventable Hospitalization Rates by City



Source: OSHPD PDD Data, 2009-11.



composite preventable hospitalization rate, at less than half of the county rate (Figure 6). The gap in preventable hospitalization rates by city (ratio of highest to lowest rates) was twice as large for the chronic composite measure (PQI #92) than for the acute composite measure (PQI #91). (data not shown).

Preventable Hospitalizations by Race

Significant gaps in preventable hospitalizations by race/ethnicity have existed since our tracking began in 2001. In addition to showing PQI rates by race/ethnicity, Table 3 provides inequity ratios by race/ethnicity for each PQI. Inequity ratios represent the preventable hospitalization rate of the racial/ethnic group with the highest rate over that with the lowest rate. In 2009-2011, African American rates for the overall composite (PQI #90) were more than two times the rates of Whites and Hispanics, and four times the rates of Asian/Pacific Islanders. For the chronic composite (PQI #92), Afri-

can Americans had five times the rate of Asian/Pacific Islanders (group with lowest rate), whereas for the acute composite (PQI #91), African Americans had two times the rate of Asian/Pacific Islanders (group with the lowest rate) (Table 3). Inequity ratios by race/ethnicity were highest for preventable hospitalizations from diabetes short-term complications (PQI #1), asthma in younger adults (PQI #15), and lower-extremity amputations among patients with diabetes (PQI #16) (Table 3).

Repeat Visits

In Alameda County in 2012, about one in six patients had multiple preventable hospitalizations from the same condition, and about 7% had more than one type of preventable hospitalization. The PQIs for which patients had the most repeat hospitalizations from the same condition were heart failure (PQI #8), COPD or asthma in older adults (PQI #5), diabetes short-term complications (PQI #1), asthma in younger adults (PQI

Table 3: Preventable Hospitalization Rates per 100,000* by Race/Ethnicity

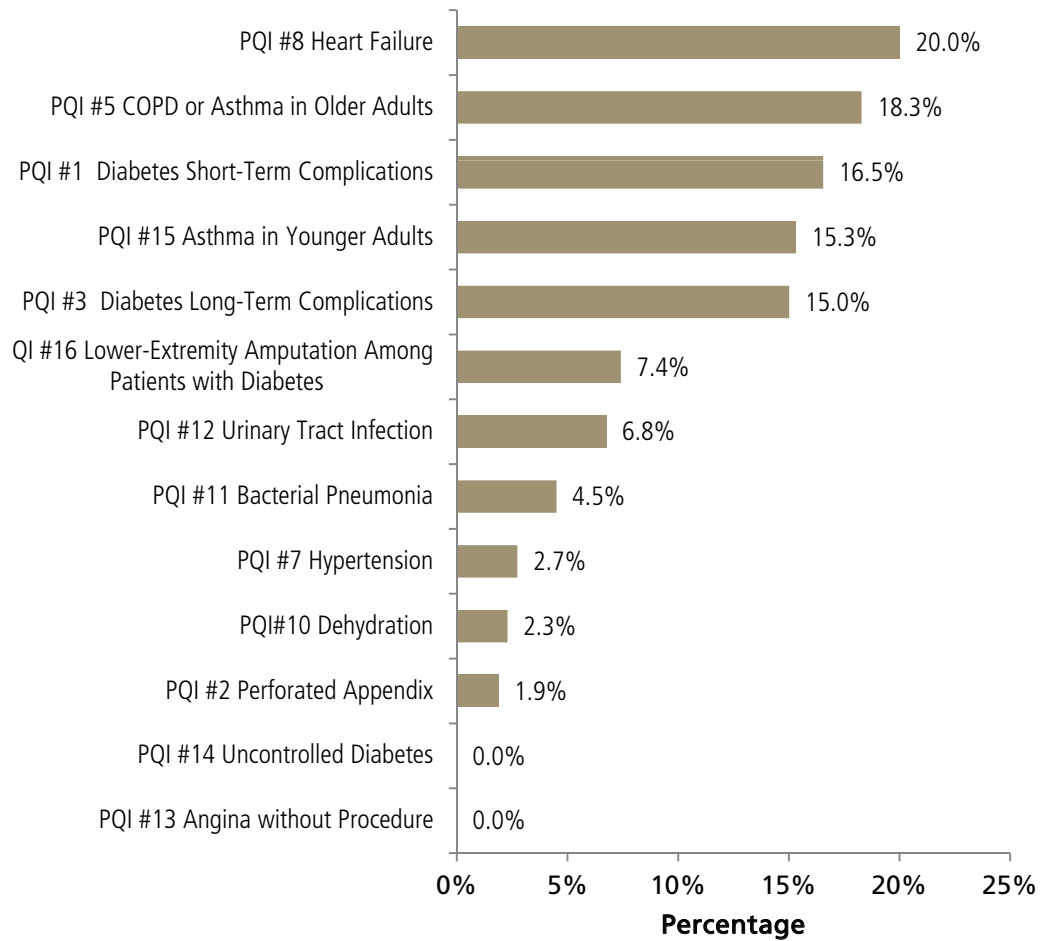
	All Races	White	African American	Hispanic	Asian/Pacific Islander	Inequity Ratio
PQI #1 Diabetes Short-Term Complications	52.8	45.3	197.6	35.6	14.1	14.0
PQI #15 Asthma in Younger Adults (Ages 18 - 39)	42.0	35.1	166.1	27.2	15.4	10.8
PQI #16 Lower-Extremity Amputation Among Patients with Diabetes	14.9	9.7	47.1	22.6	5.0	9.5
PQI #10 Dehydration	74.5	81.6	139.1	48.2	16.8	8.3
PQI #7 Hypertension	27.9	15.0	96.3	22.5	16.8	6.4
PQI #3 Diabetes Long-Term Complications	103.1	77.2	288.9	114.6	50.2	5.8
PQI #14 Uncontrolled Diabetes	10.2	8.7	27.6	9.2	5.1	5.4
PQI #5 COPD or Asthma in Older Adults (Ages 40+)	379.5	349.2	959.4	252.0	195.6	4.9
PQI #8 Heart Failure	317.7	274.6	723.5	261.1	205.8	3.5
PQI #13 Angina Without Procedure	19.8	19.4	35.0	16.4	13.1	2.7
PQI #12 Urinary Tract Infection	157.2	169.5	229.1	145.2	97.8	2.3
PQI #11 Bacterial Pneumonia	216.7	238.8	313.7	178.9	136.1	2.3
PQI #2 Perforated Appendix*	25.8	24.9	30.4	23.1	27.9	1.3
PQI #92 Chronic Composite	787.5	673.8	2,055.1	632.2	425.2	4.8
PQI #91 Acute Composite	447.7	489.4	681.5	370.8	274.3	2.5
PQI #90 Overall Composite	1,236.5	1,163.0	2,748.3	1,004.8	699.7	3.9

Source: OSHPD PDD Data, 2009-11.

Note: * PQI #2 Perforated Appendix is per 100 appendicitis cases.



Figure 7: Percentage of Patients with Repeat Preventable Hospitalizations for Same Condition



Source: OSHPD PDD Data, 2012..

#15), and diabetes long-term complications (PQR #3) (Figure 7).

Discussion

Our ability to live a long, healthy life is influenced by factors outside of our personal control. Having access to resources and amenities within a community—such as good schools, quality jobs, clean air, safe and walkable streets, grocery stores, strong local businesses and financial institutions, and quality healthcare—supports good health for its residents. However, systemic and discriminatory practices and policies have resulted in disparities in access to basic and fundamental resources and social services among different groups in Alameda County and throughout the country.

Among adults in Alameda County, those ages 75 and over are especially burdened by preventable hospitalizations. They represent 56% of all preventable hospitalizations while only making up 6% of the populations and 24% of total hospitalizations. Some research points to the need for improved continuity of care, citing that adults on Medicare ages 65+ see an average of seven physicians annually; preventable hospitalizations may be a result of poor information transfers between multiple health care providers.^{3,4,5} Research looking at preventable hospitalizations due to congestive heart failure among Medicare patients concludes that cardiologists and other providers should more fully address comorbidities in their management strategies in order to reduce these preventable hospitalizations.⁶ Further



research is needed into why older adults are disproportionately burdened with preventable hospitalizations.

Large gaps in PQI rates also exist by race/ethnicity—for some PQIs, these gaps are over 10-fold. Most commonly, gaps by race/ethnicity for preventable hospitalization rates are wider than gaps for total (including non-preventable) hospitalizations rates that we track for Alameda County. Thus, preventable hospitalizations provide a lens through which one can observe the largest magnitude of inequities, and track changes therein. Lack of access to quality primary care, compounded by other social and environmental determinants of health, make the African American population particularly vulnerable to high rates of preventable hospitalizations. This may reflect the collective impact of racism and discriminatory practices at many levels over many decades.

Large gaps in PQI rates also exist by place. Preventable hospitalizations rates in Alameda County are highest

in Hayward and Oakland, followed by San Leandro, Newark, Union City, and San Lorenzo. In addition to access and quality of care issues, spatial patterns in PQI rates may reflect disease patterns by race, income, and environmental conditions such as air pollution. For example, for COPD or asthma preventable hospitalizations, areas with the highest preventable hospitalization rates overlap with many of the areas with the highest poverty levels (data not shown).

Preventable hospitalizations are a costly and burdensome consequence of a community healthcare system's inability to provide adequate access to high quality preventative primary health care. Examining trends by age group, racial/ethnic group, and geography could help inform us about how to target our prevention efforts, and could help us understand how the Affordable Care Act may be impacting health equity in our county.

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