Putting Schools on the Map

Linking Transit-Oriented Development, Households with Children, and Schools

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Transit-oriented development (TOD) remains a popular strategy to achieve environmentally sustainable infill development and auto use reduction. Typically, TOD in the United States offers retail amenities and housing catering to single individuals, childless couples, and empty nesters. Municipal and regional leaders increasingly hold a vision for managing expected growth that aims to increase equity, support households with children, and create mixed-income communities and that includes TOD as a core strategy. These explicitly equity-focused and family-oriented goals call for a different TOD model than has typically been developed. This new model requires an examination of the ways that TOD might attract households with children concerned with access to high-quality schools, even when schools are outside the domain of traditional transportation and land use public agencies. This paper first reviews the TOD and transportation literature and its attention to households with children and issues of public schools for students from kindergarten to Grade 12. Given the information from the literature, a conceptual framework of 10 core connections between TOD, households with children, and schools is hypothesized. Four exploratory case studies from the San Francisco, California, Bay Area offer insights into the opportunities and tensions that practitioners face in planning and implementing TOD that might attract families. A discussion of the 10 core connections in light of the case study evidence follows. The paper concludes with policy and research recommendations.

To date, transit-oriented development (TOD) in the United States has typically been real estate development adjacent to major transit hubs, most often with a mixed-use approach that combines housing and retail close together in relatively high densities. TOD implies "a regional framework of transit and intelligently located development but is ultimately just one dimension of a broad range of strategies needed to shape healthy regional growth" (*1*). Thus, at a local level, in urban and suburban areas, these concepts are adapted to fit the local context of each TOD site and matched to other development and investment strategies. Interest in TOD has grown across the country in the past decade and is increasingly used as a strategy to achieve environmentally sustainable infill development and auto use reduction (*2*). Both scholars and practitioners have focused TOD on higher-end housing that caters more to empty nesters or young professionals without children rather than to households with children or lower-income households (*3*).

TOD advocates and public agencies have recently started to articulate equity- and family-oriented goals (*4–7*). As Reconnecting America states, "Access to good schools, early childhood education and quality childcare are integral to the idea of complete communities" (*4*). Similarly, Mile High Connects, a public–private regional planning partnership, notes, "In Metro Denver [Colorado], low-income families who depend on public transportation have limited school options. . . . By helping to ensure easier access to quality early education and childcare . . . we can improve children's ability to succeed" (*5*). Realization of these goals requires a TOD model different from that typically implemented in the United States and requires an examination of the ways that TOD might attract households with children, which place a high value on housing with access to high-quality schools. Additionally, a new model would need to consider the ways in which TOD relates to local schools.

To provide policy makers, advocates, and researchers with better insight into these issues, this paper offers exploratory research of the following questions in the context of the San Francisco, California, Bay Area:

1. What issues and questions about households with children and schools have emerged among stakeholders in current TOD planning processes?
2. How do these issues and questions differ by the local context of TOD planning processes?
3. What policy and planning opportunities exist to address these issues and support both successful TOD and high-quality educational opportunities for families?

Because schools are outside the authority of traditional transportation and land use public agencies, this research explores instances of cross-sector and interagency collaboration. A jurisdictional mismatch challenges these kinds of collaborations. For example, in California, school district geographic boundaries rarely match the boundaries of other local planning entities, funding streams are separate, and years of parallel and independent work have led to entirely separate, compartmentalized planning practices (*8–10*). Although agencies may be funded and managed separately, the outcomes of school and city planning are tied. Nonschool factors, such as access to housing and transportation choices, affect children's performance in school and access to schools. Likewise, the quality of public schools affects planners' ability to attract households with children to new developments.

New partnerships point to policy possibilities for the realization of cross-sector, fiscally efficient win–win situations. The federal

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government is setting the stage with innovative programs such as Choice Neighborhoods and Sustainable Housing and Communities. These programs promote sustainable development and address the needs of diverse households while still recognizing the independent work of key agencies, such as the U.S. Departments of Housing and Urban Development, Transportation, and Education and the U.S. Environmental Protection Agency. These federal partnerships underscore the relationships that exist between housing, neighborhoods, schools, and sustainability goals and support similar collaborations at the state, regional, and local levels.

This paper first reviews the TOD and transportation literature and its attention to households with children and schools for students from kindergarten to Grade 12 (K–12 schools). Given the information from the literature, a conceptual framework for understanding the 10 core connections between TOD, households with children, and schools is hypothesized. Four exploratory case studies from the Bay Area are then described and illustrate the opportunities and tensions faced in the planning and implementation of this new model of TOD. The hypothesized connections are then revisited in light of these cases. Finally, the paper concludes with policy and research recommendations.

LITERATURE REVIEW

Practitioners and scholars define TOD differently across the country, although consensus exists that TOD is "compact, mixed use development near transit facilities" and provides a "high-quality walking environment" (*3*). TODs serve as nodes in transit systems and as vibrant places and communities (*11*), often referred to as transit villages (*12*), with a nearby mix of commercial, residential, and public uses (*13*). Planning for TOD is conventionally pursued through partnerships between transit agencies, cities, and private developers.

Through their national survey of 90 transit agencies, Cervero et al. found that the primary goal of TOD is to raise transit ridership and revenue income for transit agencies and that improved economic development, widened housing choices, and enhanced quality-of-life goals are secondary (*3*). Whether they are primary or secondary, TOD potentially offers some benefits. For example, a statewide examination of TOD in California found benefits to include mobility choices; increased public safety; increased transit ridership; reductions of vehicle miles traveled, air pollution, and energy consumption; increased household income; conservation of open space; economic development and revitalization; decreased infrastructure cost; and more affordable housing (*14*).

Thus, advocates and scholars of TOD tout its multifold benefits not only to transit agencies but also more broadly to neighborhoods through improved livability. The term "livability" is inclusive of "clean air and water, safe streets, positive race relations, affordable homes, quality public schools, greenery and open space, uncongested roads, and low taxes, among other things" (*15*). A number of studies and working papers identify qualities of livability as key principles for TOD success. For example, the Urban Land Institute identifies TOD to be a way to "create the kind of place in which residents want to live, work, play, and raise their children" (*16*). Belzer and Autler also cited access to services for all ages as a determinant of successful TOD (*17*). Dunphy and Porter suggest that the "seven key principles" of successful TOD include a "community vision for a place in which residents want to live, work, play, and raise their children" (*18*).

Even though not all of these diverse benefits are fully empirically supported, much of the practitioner-oriented and scholarly literature makes explicit mention of schools and children in TOD goals. Even when attempts are made to measure livability, the benchmarks used do not tend to address issues concerning households with children. Instead, they are most commonly pegged to the lifestyle preferences of single individuals, childless couples, and empty-nester baby boomers (*3*), including access to retail amenities, open space, and particular housing options. Hess and Lombardi suggest that "TOD is least likely to succeed in places with few amenities to claim as a locational advantage" (*12*), implying the need to understand factors that generally influence housing location choice. However, given the broader goals of TOD to attract households with children, an understanding of family housing choice requires an understanding of the role that schools play in location decisions (*19, 20*).

For the most part, TOD scholarship has given almost no attention to households with children or their preferences for high-quality K–12 schools near their homes. One exception is the work of Cervero and Sullivan, who examined TODs across Europe and Australia and found many that were explicitly designed to attract households with children, unlike their counterparts in the United States (*21*). They argue that TOD benefits children in three specific ways. First, TOD emphasizes pedestrian infrastructure over automobile infrastructure. Second, TOD encompasses mixed uses, which fosters an active street life. Finally, TOD offers high levels of transit service that enable children to access various activities.

Other transportation scholarship has focused on issues of mode choice for trips to and from school. In the United States, the past 50 years has seen a marked increase in the number of automobile trips to school (*22–24*). As McDonald et al. found, 12.7% of students in kindergarten to Grade 8 usually walked or biked to school in 2009, whereas that proportion was 47.7% in 1969 (*25*). They also found that school travel by car represented 5% to 7% of vehicle miles traveled and that cars traveling to school represented 10% to 14% of all private vehicles on the roads (*25*). These travel-to-school trends are generally attributed to the fact that households with children tend to prefer the ease and flexibility of private auto travel and therefore exhibit higher rates of private auto travel (*26, 27*). Thus, this decrease in active transportation not only has negatively affected individual health outcomes, according to some research (*28*), but also has increased traffic congestion and may create hazardous conditions for children, particularly those traveling by bike and on foot (*29*).

Some planners focus on neighborhood form, assuming that walkable and safer TODs will encourage more walking and biking to schools. As McMillan found, form is important but is only one of many factors that affect mode choice. She also cites "neighborhood safety, traffic safety, household transportation options, caregiver attitudes, social/cultural norms, and socio-demographics" as key issues (*29*).

Other scholars have delved into more complexity around the impacts of school quality and school district policy on travel behavior. S. He examined mode choice as a function of school quality and found that "students living in areas with better quality schools did not exhibit higher rates of active commuting compared with those living in low-performing school service areas" (*30*). This study recommends additional school bus coverage across a greater geographic area because this "may be the only transportation means for low-income families to reach distant schools and it may be more convenient for parents than chauffeuring their children in private vehicles for high- and medium-income families" (*30*). The author does not consider the opportunity that other transit and housing options, such as TOD, may provide to enable more active commuting by students.

Wilson et al. argue that understanding the school commute mode requires investigation of complex factors that, in addition to urban form, include school district assignment policies and the landscape of school choice (*31*). They found that "school choice substantially influences school commuting travel behavior, mainly by increasing travel distance, and subsequently, mode choice" (*31*). Given the increasing popularity of school choice policies across the country and decreases in state and school district budgets for school busing, Wilson et al. argue that consideration of "travel demand, racial and economic equity issues, trade-offs between public and private costs, and environmental implications" during establishment of district policies is necessary (*31*). Those more likely to be transit dependent (low-income students and students of color) may have a harder time accessing school choice options (*32*). The role that TOD may play in increasing these students' access to school choice options was not addressed, however. The school mode choice literature has lessons that can be further explored in the TOD context. As this scholarship reveals, a household's school selection is connected to complex patterns of school attendance and school options, and this is especially true in urban neighborhoods and diverse metropolitan regions.

TOD is not without its critics. Scholars have argued that residential development is challenging for cities because of complex financing mechanisms, because residential development results in less taxable land uses, and because some perceive higher-density projects as creating costs that exceed the tax revenue generated from the project (*33–35*). Cervero et al. have documented that one such perceived cost is schools; even though TOD in the United States is rarely built for households with children, schools persist as a "political barrier" to the achievement of TOD because of community concerns about the influx of more school-aged children and school overcrowding (*36*). Furthermore, Kahn documents the rising housing costs associated with TOD, generating concerns of gentrification that can negatively affect lower-income families (*37*). Pendall et al. also note that one of the three key equity-related challenges to implementing TOD is the creation of mixed-income housing (*38*). Finally, researchers have studied the extent to which increases in transit ridership are a function of self-selection rather than investments in infrastructure, such as TOD (*39–41*), casting questions over the potential impacts of attempts to influence families' mode choice for school-related trips. Despite these criticisms, TOD remains a popular development strategy for practitioners across the country.

CONCEPTUAL FRAMEWORK: TEN CORE CONNECTIONS

On the basis of this review of the literature, the following conceptual framework lays out hypothesized connections between TOD, households with children, and schools. These 10 core connections begin to address the gaps in TOD and transportation scholarship identified and the challenges faced by practitioners who look to TOD as a development strategy for meeting the needs of mixed-income households with children:

1. School quality plays a major role in families' housing choices. Where parents live determines the access to particular schools for their children (*19, 42, 43*). Access to quality schools thus plays a strong role in housing choice. In a 2000 national survey, quality schools ranked first among the items that residents of suburban areas and smaller cities said would draw them to live in a more urban setting (*44*).

2. A wide mix of housing unit types is needed to attract diverse families. The complexity of financing TOD and the strong market among empty nesters, single individuals, or couples without children often lead developers to build primarily studio and one- and two-bedroom housing units. Families with children prefer multiple bedrooms and may require other design features to accommodate children. Developments with more three- and four-bedroom apartments and townhomes offer more family-friendly options. The inclusion of mixed-income family housing is also important to ensure that low- and moderate-income households have access to the benefits of living in TOD, particularly as transportation policies disproportionately negatively affect low-income communities and communities of color (*32*).

3. Housing unit mix, school enrollment, and school funding are intricately related. New housing is likely to increase enrollment at nearby schools, which in turn affects school district funding and school operations because schools are typically funded per student. Tax revenue may increase because of TOD (*3*); although in many places this revenue may directly contribute to school funding, it may not cover the full costs of additional students. Furthermore, schools that are at or above capacity may not be able to accommodate additional demand. For schools that are underenrolled, new students may bring additional funds and enhance the use of existing school facilities.

4. Children often use transit to get to and from school and after-school activities. For many students, especially in cities and denser suburbs, transit access to educational options in and out of school may hinge on access to safe, reliable, and affordable transportation (*30, 32*). This access to transportation options can facilitate students' on-time and consistent arrival at school, reducing truancy and tardiness. Furthermore, a decrease in residential density is one reason that children live farther from their schools, resulting in less active commuting and lower levels of independent mobility (*31, 45, 46*).

5. Multimodal transit alternatives support access to the landscape of school options. The educational landscape across the country is continually changing, and students and families now have an increasing number of school options both within the public system and through private alternatives. Children no longer necessarily attend their closest neighborhood school but, rather, may choose to attend a traditional public school, a public charter school, a public magnet school, or a private school outside their neighborhood, choices that all depend on particular transportation options (*31*). These diverse school locations change travel distance, which influences mode choice (*45, 47*). TOD can support enhanced access to multimodal transit, supporting educational options for all families.

6. Mixed-income TOD provides opportunities for educational workforce housing. School districts often struggle to recruit and retain new teachers. TOD that includes affordable housing could help attract and retain public school teachers and present an opportunity for the school district to partner in the TOD process.

7. TOD design principles support walkability and safety for children and families. TOD design principles address barriers to walking and bicycling to school. As Cervero and Sullivan document in Europe, TOD models emphasize pedestrian infrastructure, such as sidewalks and crosswalks; create active, vibrant street life; and aim to increase transit use by a broad range of riders, building community support for greater safety and reliability (*21*). These design principles go beyond the design of streets to include the design and planning of buildings to support pedestrian activity.

8. TOD can bring family-serving amenities and services closer to residential areas. Households with children seek different amenities

than households without children, and the mix of uses in neighborhoods near transit provides opportunities for services and amenities that attract and support families, such as libraries, community centers, and playgrounds. Because child care is often cited as a major reason that commuters are unable to take transit to work (*15*), TOD with child care meets a vital need.

9. Integration of schools with TOD may provide opportunities for shared use of public space. When new transit investments and TOD are located near existing schools, opportunities arise for community use, often referred to as "joint use," of the school's open space for parks and playgrounds, especially in areas that lack these amenities. In such cases, TOD and school district capital funds might be leveraged to improve the quality of public spaces for both resident and student use (*48*).

10. TOD offers opportunities for renovating and building new schools in developments. Planning for TOD presents opportunities to incorporate new schools and attract families. The creation of small schools, charter schools, magnet schools, or other specially focused schools may be an especially good fit. Building a new school within a TOD also presents joint use opportunities specially designed to support the new development.

METHODOLOGY

Four exploratory case studies in different cities were conducted for an examination of the dynamic process of planning for TOD (*49*). They offer a preliminary test of the hypothesized core connections between TOD, households with children, and schools in the San Francisco Bay Area TOD planning processes.

The four cities had current or past planning processes that were funded by the metropolitan planning organization, the Metropolitan Transportation Commission (MTC). Each city was part of a foundation-funded initiative that focused on TOD as a strategy to increase affordable housing and transit opportunities across the region. The four cases represent a geographic diversity of urban and suburban areas across three of the region's nine counties. Research was conducted in 2009, and each case covers a specific TOD planning process spanning from 2006 through 2009.

In addition to geographic distribution, these cases also represent different phases of the development timeline: preplanning, planning, and implementation (Figure 1). Finally, the cases include light and heavy rail, Bay Area Rapid Transit (BART).

The in-process planning efforts—in Pittsburg and San Jose, California—were two of the eight pilot grantees of MTC's Station Area Planning grant program. According to MTC's transit-oriented development policy, the Station Area Planning grant program funds city-sponsored plans that "are intended to address the range of transit-supportive features that are necessary to support high levels of transit ridership" (*50*). The preplanning process in Oakland, California, was foundation funded, and Oakland subsequently received a Station Area Planning grant in MTC's second round of awards. San Leandro, California, had moved to implementation; other station area plans in the city were funded by MTC's program, and outreach efforts around the development of affordable housing in the first phase of implementation were foundation funded.

For each case, relevant TOD station area, specific, and general plans were reviewed. If available, school district facilities plans were also reviewed. Census data on population, housing tenure, income, and race and ethnicity for each planning area and the city were collected and analyzed. Census and educational data on school enrollment, academic performance, income, and race and ethnicity were also collected and analyzed for all school sites and districts within or adjacent to the planning area. Researchers went on site tours, either individually or facilitated by city or nonprofit organization staff.

Interviews were conducted with key stakeholders, including city planning, city manager, or redevelopment agency staff; elected city council members; elected school board members; school district superintendents and staff; private or nonprofit housing developers; nonprofit organization staff; and school district demographic analysts. At least one nonprofit organization staff, one city stakeholder, and one school district stakeholder were interviewed for each case study. Interviews were conducted in person at the interviewees' offices or by telephone and lasted 1 to 2 h, on average. The research team inquired about the general scope of the planning process, any issues related to schools or families that emerged from the process, past and current collaborations between the city and the school district(s), and any conflicts during the process. The research was funded by a local community foundation, which facilitated access to staff in nonprofit organizations working as part of a regionwide coalition advocating for smart growth and inclusive TOD planning and implementation. Subsequent interviews with city staff and council members were accessed by use of a snowball sampling method. School district leadership and staff were contacted directly by the research team. Interviewees vetted full case study narratives to ensure accuracy.

SAN FRANCISCO BAY AREA CONTEXT

The San Francisco Bay Area offers a rich opportunity to investigate questions at the nexus of TOD planning, households with children, and schools because of its demographics, complex educational landscape, and regional and local stakeholders' commitment to broader goals for TOD. Furthermore, the Bay Area offers a diverse range of transit service with rail, ferry, light rail, buses, and proposed bus rapid transit. Nearly one-third of households in the Bay Area have children. Additionally, low- and moderate-income households use transit at

FIGURE 1 Phases of development of TOD case study sites.

"more reliable rates than those with high incomes [and] they also stand to benefit the most from the cost savings of TOD" (*51*). In the Bay Area, in 2008, approximately 25% of households with children under age 18 years also had incomes at or below 80% of the area median income (*52*). Finally, roughly one-fifth of the Bay Area population make trips to and from a public school everyday; school-based automobile trips account for 12% of all regional automobile trips, and these trips significantly contribute to traffic congestion and greenhouse gas emissions (*53*). Given this reality, regional officials, local leaders, and smart growth advocates recognize that TOD and mixed-income housing for households with children have synergies in the Bay Area context (*54*).

Like many other large metropolitan regions in the United States, the Bay Area K–12 educational landscape is complex and diverse. It is home to more than 950,000 public school students across 175 school districts with more than 1,000 schools (*55*). School districts vary in size from a few hundred to tens of thousands of students. About 70% of the Bay Area's public school students are students of color, and close to a quarter are English language learners. Furthermore, 37% of Bay Area students qualify for free and reduced lunch, indicating that they come from families living at or below the federal poverty line. The quality of school districts and schools likewise varies across the region; and low-income, African-American and Latino, and English language learner students face serious opportunity and achievement gaps (*56*).

In general, across the country, school districts are autonomous from city, county, and regional governments and are not required to be involved in urban planning processes. In California, school district geographic boundaries rarely match the boundaries of other local planning entities; a school district might lie across several cities or encompass both incorporated and unincorporated areas, or one city may have multiple school districts within its jurisdiction. In California (and nationwide) no formal policy apparatus exists at the local, regional, or state levels that requires or incentivizes school districts and other local governments to work together to plan school infrastructure as part of larger urban development or redevelopment (*8*). As a result, entrenched compartmentalized planning practices have emerged; deep distrust frequently exists between school districts and other local governments (*9, 10*).

CASE STUDIES

The context, key issues, policies, and other pertinent findings from each case are summarized below.

Oakland: Lake Merritt BART Preplanning for Station Area Plan

The Oakland Lake Merritt BART Station Area Plan will increase housing and community amenities in an area of downtown Oakland. As part of the preplanning, local nonprofit organizations conducted workshops and surveys to assess residents' priorities for the planning project. Parks and open space were identified as highly valued amenities. Key priorities also included improved public safety, more living wage and green jobs, and more affordable housing, especially for seniors.

The target area is home to a range of prekindergarten through community college educational assets. The K–12 educational facilities are part of the Oakland Unified School District (OUSD), which shares its jurisdictional boundaries with the city of Oakland. Although OUSD is suffering from decreasing enrollment and educates predominantly low-income and African-American and Latino students, the public elementary school in the planning area predominantly has Asian students and is operating at capacity. The school is one of the highest-performing schools in the OUSD. Many students live in the neighborhood and walk to school with parents or grandparents, making safe pedestrian access a priority.

The school is adjacent to a city-run recreation center, and the two entities share playground space through an informal, yet long-standing, joint use agreement. Three charter schools draw students from across the city, and a small high school with a curriculum centered on an internship program sends students out of the neighborhood during the school day. The high school is part of the Downtown Educational Complex, a new development at the eastern end of the planning area started in 2010. In addition to the high school, the Downtown Educational Complex will house an elementary school and a children development center. Finally, the community college's 60-acre campus is at the doorstep of the BART station.

Demographic shifts due to new development may increase enrollment numbers at local schools and change the cultural, racial, and ethnic mix of students. Interviewees raised concerns about increased school enrollment and potential negative impacts, given the capacity of the school. Interviewees also commented that open space for all ages is another top concern for the community, especially when the current constraints on the local recreation center are considered. The current joint use of the recreation center lays a strong foundation for future opportunities for joint use of both the school space and any new open space that the TOD may bring.

With increased housing and population, management of traffic congestion and enhancement of the pedestrian infrastructure are key priorities for families with children in elementary school. The high school and the charter schools in the neighborhood serve students from across the city. The high school's robust internship program relies on students' ability to navigate transit during the school day. Finally, Laney College serves students from across the East Bay. For these reasons, a reliable, affordable, and safe transit system will be required. Therefore, management of traffic congestion and enhancement of the transit, bicycle, and pedestrian infrastructure are key priorities for TOD.

Pittsburg: Railroad Avenue Specific Plan for East Contra Costa BART Extension

The Pittsburg Railroad Avenue Specific Plan proposes a new neighborhood as part of the BART extension to this suburban area of eastern Contra Costa County. A vast majority of Pittsburg residents travel outside Pittsburg for work, with many taking the 50-min BART ride to downtown San Francisco. The city of Pittsburg is home to the Pittsburg Unified School District (PUSD) and Mount Diablo Unified School District; only PUSD is located in the planning area.

Because its schools are at capacity, PUSD estimates that the new housing would necessitate the construction of new elementary and middle schools and has suggested that a developer could build the new school in conjunction with the new TOD. The city and school district currently have a range of joint use agreements for shared use of park space and facilities. The Specific Plan includes additional policies, including building child care facilities as part of the new TOD and identifying of opportunities for joint use of school facilities. PUSD has been leading a collaborative effort with the

local community college, a state college, and the redevelopment agency to build a living–learning community for teachers. This special housing community would be open to residents of Pittsburg and specifically target working class individuals who have not earned a postsecondary degree but who are interested in becoming public school teachers. The project would provide affordable housing and a residential support community for teachers in training.

According to interviewees, staff-level collaboration between the city and school district is strong, despite a culture of distrust between the elected officials on the city council and the board of education. Thus, an interviewee suggested that formal lines of communication are critical for maintenance of continuity amid personnel changes and ongoing school district participation in planning processes.

San Jose: North 1st Street Light Rail Corridor Plan

The San Jose North 1st Street Light Rail Corridor Plan proposes the conversion of industrial zones into a high-density residential development in this important employment center in Silicon Valley along the Santa Clara Valley Transportation Authority's light rail line. The Corridor Plan calls for multimodal access to jobs, parks, retail, and schools and includes plans for 32,000 new dwelling units.

San Jose faces a complex institutional environment; 19 school districts are located within the city of San Jose boundaries. The city has an extensive city–school collaborative infrastructure that, according to interviewees, helped set a positive tone for city–school district relationships in the area. Four school districts overlap the planning area. Of the four districts in the planning area, two serve K–12, one serves kindergarten to Grade 5, and one serves Grades 9 to 12; and they vary greatly in size. All are experiencing increasing or stable enrollment. Attendance catchment zones do not align with the planning area boundaries, so the impacts of new housing development on specific schools are not yet clear.

The Santa Clara Unified School District will be most affected by the new development because of the location of its schools in the planning area. These schools struggle with limited resources to serve high-need students, many of whom come from low-income or very-low-income households. Their performance ranges from poor to good; planners raised questions about the likelihood that new residents, particularly middle- and upper-income residents, would send their children to these schools.

Estimates of the number of new students generated by the project range from 2,905 (projected by the city) to 7,040 (projected by the Santa Clara Unified School District). Because the schools are currently at capacity, this increase in the number of students will require new school construction, a requirement that raises questions of financing, school site location, and school design. A working committee that included staff from the city, the redevelopment agency, and the four school districts affected issued a report in early 2008 that proposed six possible sites and identified funding mechanisms for the construction of new elementary schools and a new high school. The proposed sites could incorporate the joint use of park space. The committee also focused on ways to design and build new schools that would be consistent with the urban character of the proposed corridor development. This may include denser, two-story schools, and one superintendent articulated a vision of linking a high school campus with retail centers, creating work-based learning opportunities for students.

San Leandro: Implementing BART TOD

San Leandro is a medium-sized city in the East Bay, just south of Oakland. The city faces a history of the use of redlining practices by banks and the real estate industry; many of the city's older, longtime residents are white, and newer families are predominantly Asian and African-American. The legacy of racism shapes the dynamics around new housing developments and older residents' relationship to the public schools. The San Leandro Station Area Plan calls for significant increases in housing adjacent to the BART station in this increasingly urban community and is in its first phase of implementation. As required by the local inclusionary zoning ordinance, 15% of the residential units in the development are affordable; they are the first affordable units in downtown San Leandro available for families.

The San Leandro Unified School District (SLUSD) serves the city. SLUSD's student population reflects the city's changing demographics, with large numbers of students of color and nearly half of all students living in low- or very-low-income households. The demographic shifts in the city have led to misperceptions about who makes up the school-age population in San Leandro. Longtime white residents appear to be unaware of the extent to which the younger population of the city has changed, and community organizing efforts were focused on residency verification and opposition to interdistrict transfers. SLUSD has worked to highlight that the district is serving the children of San Leandro. A long-standing city–school district liaison committee includes three members each from the city council and the board of education and coordinates a number of policies and activities, including agreements on the joint use of school playfields and gyms.

Schools in San Leandro are at or above capacity and experiencing stable to increasing enrollment trends. SLUSD is expanding its facilities; in 2006, voters approved a bond for modernization and new construction. Despite this new construction, school capacity remained of great concern during the planning of the TOD. Although the city's general plan and the TOD strategy call for collaboration between the city and SLUSD to mitigate any impacts on the schools, the plan makes no provision for the siting of new schools. Further, SLUSD questioned the student generation numbers provided by the city and suggested that they were too low. These concerns about impacts on schools persisted through implementation, coupled with concerns about parking, property values, and crime. Because this TOD was in the implementation phase, the nonprofit housing developer played a critical role in mediating conflicts about student generation data and easing tensions between city and SLUSD staff.

DISCUSSION OF RESULTS

The four case studies offer some evidence in support of the hypothesized 10 core connections. They also suggest areas in which further research is necessary to understand fully the relationship between TOD, households with children, and schools. Next, the 10 core connections are elaborated on with specific reference to the case study findings. Table 1 summarizes these findings.

All four cases provide evidence for Connections 1 to 3, focused on the role that schools play in families' housing choices; the appeal of a diverse unit mix; and the relationship between unit mix, school enrollment, and school funding, respectively. Interviewees across the four case study sites indicated that high-quality schools play a role in attracting families to new development. The elementary school in

TABLE 1 Evidence of Hypothesized 10 Core Connections Found in Case Study Sites

Hypothesized Core Connection	Oakland	Pittsburg	San Jose	San Leandro
Housing choice	✓	✓	✓	✓
Unit mix	✓	✓	✓	✓
School funding	✓	✓	✓	✓
Transit to school	✓	X	X	X
Access to school options	✓	X	X	X
Workforce housing	X	✓	X	X
Walkability	✓	✓	X	X
Amenities and services	X	✓	X	X
Shared use	✓	✓	✓	✓
School construction	X	X	✓	X

NOTE: ✓ = case study provides support for hypothesized connection;
X = case study does not provide support for hypothesized connection.

the Lake Merritt BART planning area in Oakland is widely appealing, although interviewees in San Leandro and San Jose expressed concern about whether schools were of adequate quality to attract diverse families to TOD. The case studies provide limited evidence of the appeal of unit mix for diverse families, perhaps because in the planning phase, this detail is not yet specified. Interviewees in San Leandro, faced with implementation, did note unit mix to be a top concern. Additional research on projects in the implementation phase and more interviews with developers responsible for building TOD would shed more light on this core connection. Beyond unit mix, further research on additional design elements that appeal to households with children (e.g., townhomes, yard space, stairs, elevators, and storage needs) is needed.

As reflected in the Oakland, Pittsburg, San Jose, and San Leandro cases, new housing is likely to increase enrollment at nearby schools; and increased enrollment in turn affects school district funding and school operations because schools are typically funded per student. In Oakland, OUSD would like to attract more students districtwide, but the specific school site adjacent to the TOD is at capacity, raising concerns of overcrowding. Pittsburg, San Jose, and San Leandro faced increased enrollment that would require new schools to be built. The burden of paying for new schools remained a challenge for districts, and concerns persisted in the planning and implementation phases.

The Oakland case provides the strongest evidence for Connections 4 and 5, which focus on student use of transit and transit's relationship to families' access to school options, respectively. Students at the adjacent high school and the three charter schools in downtown Oakland use transit to access in-school and extracurricular activities. Many community college students also ride transit. The other case study sites did not identify student transit ridership to be a top priority. Given the scholarship on travel choice, further research specifically on student and family choice is needed to understand the impacts of TOD and school travel. Interviewees also articulated the importance of the BART station plan to support enhanced access to transit for students coming into the neighborhood to attend charter schools and the specialized high school, options that may not be available to those same families without good transit access. Again, further research, specifically on student and family choice, is needed to understand the impacts of TOD and school travel.

Pittsburg provides the only example of Core Connection 6, the use of TOD and infill development as an opportunity to create workforce housing, and the only case to identify TOD explicitly as an opportunity to create family-serving amenities, such as child care facilities, Core Connection 8. PUSD's work with the redevelopment agency and a local community college to develop a teachers' village addressed the dual need for more teachers and affordable housing. This development is a model for TOD that could help attract and retain public school teachers and that could present an opportunity for the school district to partner in the TOD process. Although other cities in the San Francisco Bay Area and across the country have proposed such projects, more research is needed to understand the opportunities for and constraints on the execution of these kinds of developments for all stakeholders, particularly developers.

Parents, grandparents, and students in Oakland's Chinatown walk to the local elementary school and other recreation amenities and prioritized pedestrian infrastructure in their visions for the planning area. Pittsburg planners spoke of design elements and site planning more generally when describing the opportunities that colocation of civic and school facilities provide. Both of these cases provide evidence for Core Connection 7, which articulates how TOD design supports walkability. Additional research could analyze the specific impacts of these design elements on students and families.

All four cases provide evidence supporting the joint use of public spaces, both city and school facilities, Core Connection 9. The four cities have active joint use agreements with their respective school districts. Furthermore, both staff and elected officials in cities and school districts see TOD and new school construction, Core Connection 10, as opportunities to expand the joint use of public facilities. Although one leader in San Jose speculated on Core Connection 10, none of the four cases provided substantial evidence for the idea, suggesting that at least in the San Francisco Bay Area context, building new school facilities as part of TOD may not be feasible for a range of political, financial, and policy reasons.

CONCLUSION AND FUTURE RESEARCH

Despite a growing push from advocates and policy makers for equity- and family-oriented TOD, research on the relationships among TOD, families, and schools remains slim. The four cases presented here provide various levels of support for the 10 hypothesized core connections and highlight the need for further empirical research to better understand the specific mechanisms at play.

The transit connectedness obtained through TOD appears to have potential for attracting families with children. The impacts of TOD on local schools may be positive and negative, and the engagement of school stakeholders in planning processes can be complex and challenging. TOD with mixed-income family housing can likely be a boon for local schools looking to attract more students, assuming that they support schools not yet at capacity. Additionally, TODs present opportunities to include new schools and child care services within their mix of uses. Nearby existing schools and new on-site schools present unique opportunities to maximize and share the use of public space as an amenity for local residents and schools. Child-related destinations are the reason for a greater percentage of family trips, which, for reasons of convenience and perceived safety, are most often taken by car. Living in a family-friendly TOD could potentially change that dynamic, shifting the daily mode choice for many families throughout the country.

This exploratory research suggests five specific areas for research and policy. First, interviewees across all the case study sites expressed

the need for increased research on capacity building to create collaborative, cross-sector partnerships between school districts, transit agencies, and city staff and elected officials. Likewise, research could examine the role of regional planning agencies and metropolitan planning organizations in funding and facilitating these sorts of partnerships. Second, scholars and practitioners can evolve the story of TOD to more explicitly include households with children and schools. The standard TOD model focuses on young professionals without children and empty nesters. As a result, consideration of schools in relation to TOD seems unnecessary.

Third, the case for the creation of mixed-income TOD furthers the need to consider how TOD can be more attractive to families. Although the inclusion of affordable housing units is increasingly an explicit priority of TOD, inclusion of affordable, family-oriented housing in TOD is no easy task; to do so, developers and cities will need additional policy mechanisms and financial strategies and incentives. Further research should include more attention to nonprofit and for-profit housing developers to build an understanding of their constraints in this arena.

Fourth, additional research on the travel choices of students and families is needed to assess the extent to which TOD could enhance educational opportunity. Finally, performance measures and outcome indicators are needed to assess the outcomes of TOD specifically for households with children and schools. Conventional TOD success metrics tend to focus on revenue for transit agencies and increased transit ridership (*3*). Although TOD advocates and developers often speak of livability benefits, associated benchmarks (*51*) are insufficient. The results of further research and case study development could be used to construct tangible performance measures and outcome indicators for successful TOD planning processes and outcomes that support families and local schools.

TOD is a popular approach in many cities across the country as jurisdictions look for ways to address climate change, build livable communities, and attract more diverse residents. Increasingly, cities include equity- and family-oriented goals in their TOD plans. Given that school quality affects family choices and therefore city growth and given that public schools already struggle with shifting enrollment patterns and strained budgets, TOD research and practice can better assess these potential impacts. A deeper understanding of the choices that families make about where they live, work, and play is fundamentally needed when TOD that could support families and subsequently increase transit usage while reaching a broader population is designed.

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