Identifying and Treating a Substandard Housing Cluster Using a Medical-Legal Partnership

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KEY WORDS: housing, medical-legal partnership, home environment

ABBREVIATIONS: Child HeLP—Cincinnati Child Health-Law Partnership; EMR—electronic medical record; HSIC—Hopple Street Health Center; LASGC—Legal Aid Society of Greater Cincinnati; MLP—medical-legal partnership; PPCC—Pediatric Primary Care Center; SDH—social determinants of health

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COMPANION PAPER: A companion to this paper can be found on page 943, and online at www.pediatrics.org/cgi/doi/10.1542/peds.2012-0769.

WHAT’S KNOWN ON THIS SUBJECT: Social and environmental risks related to substandard housing contribute to adverse health outcomes. Partnerships between the health care and legal systems can help families address such risks and help clinicians understand the legal context of health.

WHAT THIS STUDY ADDS: A medical-legal partnership colocated in a pediatric primary care setting identified and treated a large cluster of poor quality, substandard housing. Housing improvements were possible because of strong collaboration between clinicians, attorneys, community partners, and families.

BACKGROUND AND OBJECTIVE: There is a documented connection between the home environment and health. Medical-legal partnerships (MLPs) can address social and environmental determinants of health. Our objective was to describe a cluster of substandard housing identified and treated by an MLP based in a pediatric primary care setting.

METHODS: Potential cases of poor-quality housing were identified during outpatient primary care. A case was defined as any rented housing unit with a reported unaddressed housing risk within a defined building portfolio (owned by a single developer) in which ≥1 child lived. An on-site MLP offered affected families legal services including ordinance enforcement and connection to resources. They also initiated portfolio-wide advocacy. Legal advocates reported case outcomes. Medical history and household demographics were collected from the medical record and compared with clinic-wide data by using Fisher’s exact test or χ² statistics.

RESULTS: After identification of a single case, an additional 15 cases were identified. Pest infestation was the most common initial risk identified. Of 14 units with outcome data, repairs were completed in 10 (71%). Of the 19 building complexes with the same owner, 11 received significant systemic repairs. Of the 45 children living within the 16 identified case units, 36% had asthma, 33% had developmental delay or behavioral disorder, and 9% had an elevated lead level. Affected children were more likely to have one of these diagnoses than the general clinic population (all P < .01).

CONCLUSIONS: An MLP identified and improved home environmental conditions for children living in a cluster of substandard housing. PEDIATRICS 2012;130:831–838
A clear connection exists between the quality of the home environment and health outcomes. Inadequately maintained buildings are predisposed to the development of indoor health hazards including pest infestation and mold. Sick-building syndrome and building-related illness, with new or preexisting symptoms or conditions exacerbated by one’s surroundings, are well established. Indeed, “sick,” substandard housing has been shown to contribute to asthma, developmental and behavioral pathology, elevated lead levels, injury, and transmission of infectious diseases. Pediatricians recognize their responsibility to provide appropriate interventions that target such factors at both the patient and community levels but admit screening in practice is inadequate, partly due to lack of available remedies in the clinical setting.

Multifactorial interventions built on relationships with public health or community agencies can be effective. One such successful intervention is the medical-legal partnership (MLP), which involves collaboration between the health care team and legal advocates to address social determinants of health (SDH). Given that families living in poverty often experience 2 to 3 unmet legal needs, when patients and families are referred for a single issue (eg, poor quality housing), legal advocates can assist with other issues simultaneously. MLPs also help clinicians understand the social and legal context of certain illnesses, provide legal assistance to families within a clinical setting, and advocate for system-level change.

Two primary care clinics at Cincinnati Children’s Hospital Medical Center, the Pediatric Primary Care Center (PPCC) and Hopple Street Health Center (HSHC), care for 22,200 predominantly low-income children in Cincinnati. Approximately 85% are covered by Medicaid, 10% by private insurance, and 5% are self-pay. Over a 2-year period, an MLP was developed with the Legal Aid Society of Greater Cincinnati (LASGC) called the Cincinnati Child Health-Law Partnership (Child HeLP). Since its launch in August 2008, Child HeLP, which has an attorney or paralegal on-site 5 days per week, has opened >1100 cases for issues relating to housing, benefits, education, family law, and immigration. Beginning in fall 2009, Child HeLP identified a pattern of referrals for poor-quality housing from patients living within a portfolio of building complexes owned by a common firm. By the summer of 2010, this pattern reflected a cluster involving patients from 16 housing units in 6 Cincinnati building complexes owned by this developer. We describe the cluster and the Child HeLP response, which led directly to housing improvements and improvements in coexistent social risks. To our knowledge, the response pursued is the first of its kind reported in the literature.

METHODS

Case Definition

A case was any rented housing unit within a defined 19-building complex portfolio owned and managed by the same firm (Firm A) in which (1) at least 1 patient aged 0 to 18 years lived who received outpatient primary care at either PPCC or HSHC, (2) at least 1 clinically relevant housing risk was reported between September 2009 and February 2011 that was confirmed by a trained legal aid advocate, and (3) the landlord and/or building manager was not addressing the housing risk adequately. A clinically relevant housing risk was defined as a potentially remediable risk with a known association with adverse health outcomes, such as cockroach or rodent infestation, water damage, or poor ventilation. An adequate response by the landlord or building manager was defined as responding to orders issued by the city health or building authorities, initiating proper repairs, or assisting with a move to a unit that met code standards.

Case Ascertainment and Response

Standard social risk screening as part of the medical history (Fig 1) is conducted for all PPCC and HSHC patients and is documented in the electronic medical record (EMR; Centricity, GE Medical Systems Information Technologies, Waukesha, WI). The standardized social history was developed after a literature review and in consultation with on-site physicians, social workers, and legal advocates. Physicians or social workers make referrals to Child HeLP based on risks identified. When a patient is referred to Child HeLP, his or her case is discussed with the multidisciplinary care team, including physician, social worker, and attorney or paralegal. Once the primary legal circumstances and concerns are

![FIGURE 1](https://example.com/figure1.png)

Social history screen embedded in EMR. SSI, social security income; WIC, Women, Infants, and Children public health program.
identified, the attorney or paralegal triages the case to determine its legal merit and required expertise. The on-site legal staff then determines whether the client should be referred to an advocate. The assigned advocate then works with the family to pursue appropriate action, such as ensuring enforcement of existing ordinances and connecting families with resources to which they have legal right. Those with housing risks identified by the clinical care team were referred for additional legal assessment by Child HeLP staff. Families were then connected with housing attorneys who provided a more thorough assessment of the home environment and helped to determine whether the family’s housing unit warranted legal action and met the case definition. Legal staff then worked with the family to pursue a legal strategy appropriate to their social and environmental situation. Discussions of protected patient health and legal information by physicians and legal advocates occurred only after the parent or guardian signed consent at the time of the Child HeLP referral.

Analysis

All data are reported as frequencies. Legal outcomes were shared with the research team by Child HeLP attorneys. Demographic and clinical data for children living within affected households were collected by review of EMR documentation. Baseline data for clinic prevalence of chronic illnesses chosen a priori, including asthma, developmental delay or behavioral disorder, and elevated lead level were obtained through a review of problem lists present within the EMR for all PPCC or HSHC patients. Children living in affected units were compared with all PPCC and HSHC children by using Fisher’s exact test or $\chi^2$ statistics. This study underwent review and was not considered human subjects research, and thus it was considered exempt by the Cincinnati Children’s Hospital Medical Center Institutional Review Board.

RESULTS

Cluster Description

The index case occurred in fall 2009 and involved a family with 2 children cared for at PPCC. Both children had previously been diagnosed with asthma, and 1 child had been recently diagnosed with an elevated lead level. They were referred to Child HeLP after reporting a pest infestation, peeling paint, and water leakages during a visit for well-child care. Five additional housing referrals were made in the winter months. In late May, a physician referred the family of a child with asthma to Child HeLP for housing complaints. The child’s mother described the presence of mold. She also presented a letter from her landlord stating that she would be evicted if she installed an air-conditioning unit in her child’s bedroom. Three similar referrals were made in the 6 weeks that followed. Early in July 2010, Child HeLP staff recognized that these and other recent referrals all originated from families living in buildings owned and managed by a single out-of-town developer.

On further investigation, Child HeLP learned that this portfolio of buildings had been sold to Firm A, the involved developer, in 2007. Soon after the sale, orders placed by the Cincinnati Health and Building Departments to remediate issues including pest infestations and water damage went unabated. When Firm A defaulted and failed to meet its financial obligations in July 2010, ownership was transferred to a mortgage company. At the time of the default, every one of the portfolio’s 19 Cincinnati-based building complexes, which contained 677 Section 8 housing units, was the subject of violations of city code with outstanding orders issued by the Cincinnati Health and Building Departments. In fall 2010, after Child HeLP staff had identified the cluster of substandard conditions, the LASGC helped to form a tenant association for which they provided legal representation. This association consisted of tenants from each complex in the portfolio. Through the association, legal advocates helped tenants to work with the mortgage company that, at the time, owned the buildings, to identify and prioritize repairs that would respond to city code standards while limiting blight and displacement. Legal advocates also met with city housing inspectors and city planners, filed and argued motions before the court, and appeared at city council meetings. The time spent working with and for clients totaled 739 hours.

Case Descriptions

Sixteen housing units were identified as meeting case definition criteria. A report of pest infestation was the most common reason for referral (69%) and the most common housing risk identified (Table 1). More than 80% of cases involved multiple home environmental risks (Fig 2). The cases involved 6 of the 19 complexes initially owned by Firm A, and all were within Cincinnati city limits (Fig 3). Mean occupancy of case units was 3.9 people (range 2–8), with a mean of 2.8 children (range 1–6) per unit. Of the 14 case units for which outcome data were available, repairs

<table>
<thead>
<tr>
<th>Risk Identified</th>
<th>n</th>
<th>%</th>
</tr>
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<tbody>
<tr>
<td>Pest infestation</td>
<td>11</td>
<td>69</td>
</tr>
<tr>
<td>Water damage</td>
<td>8</td>
<td>50</td>
</tr>
<tr>
<td>Inadequate ventilation</td>
<td>4</td>
<td>25</td>
</tr>
<tr>
<td>Eviction threat when air-conditioning requested</td>
<td>4</td>
<td>25</td>
</tr>
<tr>
<td>Other (eg, peeling paint, gas leaks, broken windows, etc)</td>
<td>8</td>
<td>50</td>
</tr>
<tr>
<td>≥2 risks identified</td>
<td>13</td>
<td>81</td>
</tr>
</tbody>
</table>
and abatements were completed in 10 (71%) as a result of Child HeLP efforts (Table 2). Six (43%) families were relocated to a safer, up-to-code apartment within a close geographic proximity to their previous residence.

Four of the 6 building complexes involving cases identified from PPCC and HSHC received complex-wide mold removal, pest abatement, and window repairs. As a result of LASGC efforts through the tenant association they helped to form, 11 of the 19 complexes within the portfolio received significant systemic repairs including installation of new roofs, ceilings, and drywall; integrated pest management; replacement of sewage systems; refurbishment of air-conditioning and ventilation systems; replacement of hallway lights; and repair of playground equipment. Emergency transfers to new units were provided for tenants living in 2 of the complexes.

**Additional Legal Needs Addressed**

Five of the 16 cases originating from PPCC and HSHC involved interventions into other legal issues. Benefit provision cases were opened for 3 families. As a result, 2 of these families received extensions in Temporary Assistance for Needy Families, and 1 family received an increase in day-care vouchers. Two families also received assistance relating to their child’s education. One child was provided with needed special education services, and another child was promoted 2 grades in school.

**Patient Characteristics**

At least 45 children lived in the 16 case units. At the time of referral, patients referred ranged in age from 2 months to 12 years, and ~50% were boys. All impacted children were African American and were covered by public insurance (Table 3). The most common chronic illness among this group was asthma or reactive airway disease (36%), followed by developmental delay or behavioral disorder (33%) and elevated lead level (9%). For comparison, among the 22,200 children who seek care at PPCC and HSHC, the estimated asthma prevalence is 19%, a statistically significant difference when compared with children living within the case units ($P = .0003$). Similarly, there were significant differences between those children living in identified case units and our clinic population in terms of presence of developmental delay or behavioral disorder ($P = .0001$) and elevated blood lead levels ($P = .0004$).

**DISCUSSION**

Health disparities in childhood are widespread and are often exacerbated by poor-quality housing. Child HeLP, an MLP colocated in our pediatric primary care setting, has allowed for an innovative approach that links families with environmental risks to legal advocates with expertise in tenants’ rights. An initial child with asthma referred to Child HeLP for poor housing conditions led to the characterization of a large cluster of substandard, poor-quality housing conditions. The Child HeLP legal and advocacy response led to improvements at both the patient and community levels, facilitating treatment of both the “sick child” and a portfolio of “sick buildings.” Strong collaboration between clinicians, attorneys, community partners (eg, health and building departments), and families facilitated an effective response targeted most appropriately at the upstream social determinants of poor health.

An MLP colocated in an outpatient pediatric primary care setting allowed for such collaboration to flourish. The addition of a strong legal partner to

<table>
<thead>
<tr>
<th>TABLE 2 Outcomes for Individual Case Units Affected ($N = 14$)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intervention</strong></td>
</tr>
<tr>
<td>Repairs initiated or completed at the unit level</td>
</tr>
<tr>
<td>Order for code violation issued with abatement of violation pending</td>
</tr>
<tr>
<td>Occupants moved to safer environment</td>
</tr>
<tr>
<td>Air-conditioning allowed without eviction threat</td>
</tr>
</tbody>
</table>

FIGURE 2
Photographs of conditions present in households referred to Child HeLP. A, collapsed ceiling; B, water leaks; C, exposed electrical outlet; and D, cockroach infestation.
the primary care team can lead to more effective and consistent risk assessment.26 Our MLP served as a mechanism for patient-level social and/or environmental risk identification and intervention, along with a parallel “diagnosis and treatment” of a community-level health risk. Such community-wide interventions can be difficult to fund and sustain.5,14 Rather than creating de novo services, the MLP model is more financially sustainable by focusing on enforcing existing ordinances and working with existing community agencies. Still, despite some initial successes, the long-term outlook for these building complexes remains unclear. Because the ownership and management of these buildings remains in question after foreclosure, so too does the continuity of many of the repairs that have been made thus far, as well as the potential risk of family displacement. Still, we expect the formation of the tenant association with representation by the LASGC will support such continuity and limit the risk of displacement.

Table 3: Patient Characteristics for Child Occupants of Case Units (n = 45) With Comparison With Characteristics of Patients Cared for at PPCC and HSHC (N = 22,200)

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
<th>All PPCC and HSHC Patients (%)</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public insurance</td>
<td>45</td>
<td>100</td>
<td>85</td>
<td>.005</td>
</tr>
<tr>
<td>African American race</td>
<td>45</td>
<td>100</td>
<td>70</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Chronic condition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asthma or reactive airway disease</td>
<td>16</td>
<td>36</td>
<td>19</td>
<td>.0003</td>
</tr>
<tr>
<td>Developmental delay or behavioral disorder</td>
<td>15</td>
<td>33</td>
<td>14</td>
<td>.0001</td>
</tr>
<tr>
<td>Elevated lead level</td>
<td>4</td>
<td>9</td>
<td>2</td>
<td>.0004</td>
</tr>
</tbody>
</table>

* Fisher's exact test or χ² statistics.
This particular cluster involved a portfolio of buildings that went into foreclosure. Although rates of foreclosure have increased substantially during the recent economic downturn, little is known about the effect of foreclosure on health outcomes. Pollack and colleagues recently demonstrated links between foreclosure and higher rates of hypertension and renal disease among adult homeowners. This study did not, however, specifically address health outcomes of tenants in foreclosed properties. Families renting properties that go into foreclosure are at significant risk for housing instability, poor upkeep, and eviction. Although we do not know with certainty the health ramifications of such factors, evidence suggests an adverse health impact of mounting socioeconomic and environmental stress.

Interventions that focus on just 1 of the SDH may lead to improvements of other social, economic, or environmental risks. Referrals to our MLP led to both home environmental and socioeconomic improvements. Linking families to community resources and agencies is an increasingly important part of patient- and family-centered care. Low-income families are likely to experience >1 health-related social problem, including substandard housing, income instability, food insecurity, and inadequate access to health care. These health-related social needs can be thought of as legal needs potentially amenable to assistance by an MLP.

Within our study sample, a referral to Child HeLP for substandard housing also led to enrollment in public benefit programs, educational interventions, and continued assistance after the initial housing risk had been resolved. The 45 children identified as living in the case units were more likely to be diagnosed with chronic illnesses, such as asthma, developmental delay or behavioral disorder, and elevated lead level, than other children cared for in our clinics. Such findings are consistent with previously established associations between the home environment and health and support the proposition that living in sick, substandard, poor-quality foreclosed properties may have significant health ramifications. Although we cannot assess whether identified housing problems caused or worsened the current health condition, it is reasonable to assume that the poor-quality housing put them at risk for greater severity. The multidisciplinary approach we describe, the partnership of clinicians and attorneys, made identification and treatment of home environmental risks possible. This, in turn, may prove to alleviate triggers and stressors that make chronic disease worse for our patients.

There were limitations to our study. Our sample was drawn from 2 clinics associated with a single institution, thereby limiting the generalizability to centers with different resources or demographics. Also, partnerships between clinicians and attorneys, although burgeoning, are still not widespread, vary from site to site, and are not always accessible for certain populations. We believe, however, that the successes of Child HeLP and the >200 MLPs around the country support further expansion and assessment of such partnerships. Additionally, our retrospective EMR review may have missed siblings or other children living in the case units. Thus, 45 may be an underestimate of the total number of children affected. Moreover, it is possible that we have underestimated the prevalence of asthma, developmental delay or behavioral disorder, and elevated lead level among case unit children. This limitation, if anything, would bias our results toward the null. We were unable to determine onset of symptoms in any of the patients, meaning we cannot claim home environmental conditions as a cause of any of the illnesses assessed. However, for the purposes of our study, identifying causation was not relevant because poor environmental conditions are known to worsen symptoms of existing chronic conditions. Finally, our study is limited by the fact that, as yet, we cannot prove that the actions of the MLP led directly to changes in health outcomes. However, the evidence supporting the link between healthy housing and health outcomes makes it a safe assumption, further supported by the significant difference in prevalence of these conditions between the case sample and our clinic population at baseline.

Although Child HeLP remains focused primarily on the individual, a more proactive approach toward pattern recognition would expand our ability to improve housing quality and other SDH (eg, systematic errors in public benefit enrollment). Future work will evaluate whether proactive case finding is possible through improved partnerships among clinicians, legal advocates, health and building departments, and community groups. The tracking of clusters of illness associated with environmental exposures has historically led to system-wide interventions such as legislation for improved identification, investigation, and mitigation. We similarly hope to identify and track patterns of poor-quality housing and unenforced housing ordinances through collaboration and cross-agency communication potentially allowing for analogous system-wide change. Finally, the clinical utility of such interventions must continue to be evaluated, perhaps by comparing health outcomes among those with sick housing cared for in settings with and without successful MLPs.
CONCLUSIONS

Clusters of social and environmental risks may be just as important as clusters of communicable disease cases in terms of individual and community health risk. Through pattern recognition assisted by a partnership of medical and legal teams, we identified a cluster of substandard housing among patients at 2 outpatient clinics that treat a largely low-income pediatric population.

The collaborative response improved the housing situation for individual patients and families, and it also created linkages between tenants leading to meaningful community-wide housing improvements. Recognition of patient- and community-level SDH through sustainable collaborative approaches can lead to effective improvement, allowing for treatment of both the sick child and the sick building.

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THE HAWTHORNE EFFECT: The deplorable working conditions in factories across the United States came to national attention in the early 1900s. By the 1920s, corporations were interested in the link between workers' productivity and their working conditions. A series of experiments were conducted from 1924 to 1932 at Western Electric's Hawthorne Works, a large factory outside of Chicago that produced electromagnetic relays for telephone switchboard assemblies. Productivity was measured under various working conditions and job satisfaction assessed by thousands of interviews. The vast data collected remain today the subject of scholarship on organizations, leadership, and motivation.1,2

The first of the studies examined the effects of lighting conditions. Although there was no correlation between the workers' efficiency and lighting level, productivity increased for a short time when the lighting level was changed, irrespective of whether it was brighter or dimmer, but returned to baseline when the study period ended. Similar changes in the workers' behavior were observed when other changes were made—e.g., the work area cleaned or relocated. Such transient improvements in behavior in response to being the subject of a study, irrespective of the specific intervention, was termed the Hawthorne effect by Henry A. Landsberger in 1955.2

The Hawthorne effect has been recognized in medical studies of topics as varied as hand washing and erectile dysfunction.3,4 The chance that a Hawthorne effect will bias results is highest when healthcare providers or patients understand that they are being observed for a study for a brief period. Readers should consider the possibility of bias when assessing the results of this type of study. The Hawthorne effect can be minimized by conducting observations over a long period and by the use of double-blind trials in which both providers and patients are unaware of either the intervention of interest or the placebo or dummy intervention.

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