

# Is There a Role for Evidence-Based Practice in Urban Planning and Policy?

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**ABSTRACT** *Can the craft of planning take advantage of a growing body of planning-relevant research? Evidence-based practice proposes a better connection between research and professional work, but raises several concerns about the character of valid evidence, the strength and clarity of planning research, and inequalities in the available resources for integrating research into planning practice. Much of planning practice is a reflective craft where skills of mediation, negotiation, listening, and framing are prominent. As part of the planner's work employing these skills, however, there is a valuable role for research-generated evidence to inform decision making. Evidence-based practice needs careful implementation but it can enrich the field of planning by linking research to practice.*

*Keywords:* Research; evidence; health

## Introduction

Professional planners rely on several different information and knowledge sources to guide their work, including past experience, general professional knowledge, new data collection, formal education, and interactions with various decision makers and community members. However, these sources, though broad in their range, do not have a clearly articulated role for planning-relevant research, and nor does much planning research impact heavily on practice. This paper examines an approach that brings knowledge generated through research more centrally into planning practice—an approach called evidence-based practice.

The past decades have witnessed an increasing body of basic and applied research in the fields of urban planning and urban studies, generated by universities, think tanks, and larger planning departments and firms. Planning is not alone in this respect; other areas such as interior design, business, education, social work, nursing, and medicine have also expanded formal research.<sup>1</sup> In each of these disciplines a divide has emerged. On one hand there is the traditional approach to practice based on rules of thumb, tradition, ongoing reflective experience, bureaucratic procedures, and, of course, more explicitly political processes (Allison & Zelikow, 1999). On the other is the potential of such practice to be informed by a growing research base on relevant topics—though that research base may be perceived by many professionals to be either inaccessible or not directly applicable to practitioners and communities.

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One branch of planning research, planning theory, offers perspectives on how such divides can be overcome. It has the potential to devise approaches to help bridge the chasm between research and practice in a sophisticated manner. Well known early literature (e.g., Faludi, 1973) wrestled with the issues of the appropriate role of science and technocratic reasoning amidst planning activities. However, with some exceptions, over the past three decades, planning theory has been absorbed with critiquing expert and scientific knowledge, celebrating local and community knowledge, or pointing out the political nature of planning. Only a few authors have offered substantive approaches for combining planning practice with a new, more diverse and more methodologically advanced base of planning-relevant research (e.g., Corburn, 2005; Faludi & Waterhout, 2006; Forester, 1999; Garcia, 1997; Heiman, 1997; Rydin, 2007).

In fields other than planning, a concept referred to as evidence-based practice (EBP) has emerged as one means to help bridge the gap between traditional practice and formal research. EBP uses research to inform the work of professionals. Most commonly, it is proposed as a way of making professional decision making more scientifically rational, and as such has received some criticism (Faludi, 2007). However, it can draw on a wide variety of research methods and can therefore be integrated with collaborative and participatory approaches that place a greater emphasis on jointly defining problems and consensus-based solutions (e.g., Healey, 1997; Innes, 1998; Van Herzele, 2004).

EBP must be distinguished from evidence-based policy, which has been widely discussed in the UK and Europe. Evidence-based policy aims to foster a more pragmatic approach to decision making by basing policy on sound reasoning (Davoudi, 2006; Nutley *et al.*, 2003; Solesbury, 2001; SPMT, 1999). Amongst other objections it has been criticized for its failure to acknowledge the social, political, and value-laden nature of evidence production (Davoudi, 2006; Shulock, 1999), and debate rages about suitable strategies for marshalling research results into the policy process (Faludi & Waterhout, 2006; Pawson, 2003). Other critics question the nature of the evidence it values (Bohme, 2002), or the role of positivism in policy making (Innes, 2002); some go so far as to question the very concept itself: "Evidence-based practice, certainly. Evidence-based policy evolution, probably. But evidence-based policy? I'm still not so sure" (Healy, 2002). Many of the criticisms have centered on the fact that evidence-based policy tends either to use a very narrowly focused definition of "evidence", with randomized controlled trials as the gold standard, or a very broad definition that verges on a simple justification or rationalization of a pre-existing position (Davoudi, 2006; Hammersley, 2005; Pawson, 2003). A number of proposals have been made to create a more nuanced EPB in the policy area (Hammersley, 2005; Pawson, 2002).

Evidence-based practice, as conceptualized in this paper is more akin to what Davoudi (2006, p. 16) refers to as evidence-informed policy, as it accommodates multiple forms of evidence, and many types of methodology for its production. Acknowledging the ongoing debate relative to the role of evidence in European policy-making, this paper focuses on EBP in the USA context, with the aim of articulating a stronger role for EBP as it applies to the field of city planning—one that stakes out a middle ground between very narrowly scientific conceptions of evidence (e.g. only randomized controlled trials count) and very broad views that merely rationalize advocacy positions. In doing so, this paper positions EBP within the context of planning theory.

This piece first outlines key characteristics of both research and practice in planning, and then examines the key propositions of EBP and its major critics, including:

- Epistemological, methodological, and political issues: What is the role for research evidence in the craft of planning practice? Is EPB just another form of rational planning or can it avoid some of the critiques generated by such planning theories?

- The strength and transferability of planning and urban studies research: In what areas is research available? What specializations within planning are most likely to integrate research findings? Can qualitative and theoretical knowledge provide useful evidence for EBP?
- The resource base for doing evidence-based planning: EBP requires substantial time and skill to systematically review and digest literature. In what areas is such activity needed on behalf of researchers and practitioners? In what planning subfields is there enough research to make it possible? In what areas do practitioners have time and capacity to carefully match available evidence to specific circumstances?

We examine the research and practice divide in planning and then clarify the differences between information, knowledge, and evidence generated from research by exploring an example of the application of EBP within a project bridging between the fields of planning and health. The paper argues that much of planning is a reflective craft, where skills of mediation, negotiation, listening, and framing are prominent. The conclusion reached is that EBP raises some key theoretical dilemmas about planning process, politics, and products, but that certain planning subfields could benefit from wider access to relevant information, and in a few of these areas there is enough research to make EBP viable. EBP needs careful implementation but it can enrich the field of planning by linking research to practice.

### **Background: The Divide Between Research and Practice in Planning**

Most professional fields demonstrate a tension between theory and practice, and urban planning is no exception. Over two decades ago, Innes de Neufville (1983, p. 42) pointed out that researchers are often more focused on defining problems than solving them; others have noted that planning researchers typically aim to identify issues, accumulate knowledge, and build theory (Baum, 1997, p. 180; Birch, 2001; Hopkins, 2001). Planning literature is littered with examples of how work in the academy: a) fails to infiltrate its way into day-to-day planning decisions, b) is inapplicable, given the political pressures of the job, or c) is overly specific to a given time and locale (Sager & Ravlum, 2005). There remains an equally important tension between practice and research (in addition to just theory and practice) in terms of key differences in the way that both communities approach problems (see Table 1).<sup>2</sup> Practice focuses on solving a specific problem, applies existing knowledge and best practices, and has more limited requirements for peer review and dissemination. Research is more formalized and relates to questions posed by the field, rather than by a specific situation.

To help overcome this gap between research and practice-oriented problem solving, planning academics have been exhorted to perform more action-oriented research, to ground their findings in real environments, to endeavor to understand what planners do, and to learn from practice (Forester, 1999; Ozawa & Seltzer, 1999, p. 265; Schön, 1983). At the same time, planning practitioners have been encouraged to look to academic research to avoid repeating past mistakes and as a source of innovation. They are urged to use planning theory “when they get stuck” and need direction, strategy, or coherence (Forester, 1989, p. 137; Forsyth, 2007; Ozawa & Seltzer, 1999). Some of the above calls—for academics and planning practitioners—suggest a rethinking of the role research can play; more specifically, a reexamination for the role of evidence and its role in planning practice.

### **What Evidence-Based Practice Claims to Do**

Some of the potential for EBP in planning can be appreciated by examining practices in medicine or business. Consider the example of a visit to the doctor. Most patients assume

**Table 1.** Research and practice in planning

Dimension*	Research	Practice
Goals and background	Responds to a question with general interest related to gaps in knowledge or key intellectual problems	Responds to a specific, concrete question meeting a need or solving a concrete problem
Methods	Conforms to research protocols, using data that has been systematically collected and analysed, and that is capable of answering a core question	Application of existing knowledge and techniques at a professional level of skill; may involve investigations of topics; adds political problem-solving skills
Relation to earlier work	Builds on, and is usually placed in the context of, previous research efforts on the subject	May use standard techniques or best practices; tends to be part of an ongoing series of projects and programs
Argument	Makes an argument that, at least implicitly, counters reasonable objections	Makes an argument that, at least implicitly, answers the need or question at hand
Documentation and evaluation	Documents and evaluates its methods and findings, so that both can be replicated by others	May be documented and made public for evaluation; not essential
Peer review	Is subject to peer review	Peer review may occur through awards or job evaluations, not essential.
Public/dissemination	Is made public though mainly accessible to other researchers	Not essential to disseminate or make public; practice is done in relation to a public good, and the needs of multiple publics
Contribution	Contributes to knowledge in a field	Solves a problem; may contribute to the body of planning tools or practices

Sources: Columns marked\* adapted from Forsyth, 2007 and Forsyth & Crewe, 2006; other sources include Groat & Wang, 2002; Hack, 1984, p. 128; Lawson, 2006; Rowe, 1987; Snyder, 1984, p.2.

that any diagnoses or prescriptions are based on years of research combined with the doctor's own opinions based on reflective practice and a detailed understanding of the needs of the patient. One imagines that doctors have access to the latest research, systematically digested in reviews or used as the basis of evidence-based guidelines, and that they tap into such knowledge. However, until recently, commentaries suggest doctors' use of research was relatively patchy and unsystematic; instead, they heavily relied on personal experience and prior practices, leading to wide variation in treatments (Cohen & Hersch, 2004; McColl *et al.*, 1998).

The EBP movement, starting largely in the field of medicine but quickly shifting to other professional fields, claims that many current professional practices are insufficient for a variety of reasons. They may be based on: 1) obsolete knowledge professionals picked up in school, 2) long-standing but never-proven traditions, 3) patterns gleaned from experience, 4) methods that the individual happens to be skilled in applying, and/or 5) information from vendors of products (Bauer, 2007; Pfeffer & Sutton, 2006a, 2006b). The evidence-based practice approach urges that professional judgments be informed by conscientious, explicit, and judicious use of current best evidence. Thus, EBP aims to integrate individual professional expertise with the best available external evidence from systematic research.

As EBP has moved beyond medicine, it has evolved to fit different professional cultures, claiming to improve and enrich practice (Bauer, 2007; Pfeffer & Sutton 2006a, 2006b) and to influence policy. It can take several forms. On the one hand, it can involve a new orientation towards applying research-based evidence in practice, encouraging individuals to adopt a questioning and critical perspective, similar to that employed when conducting research (Table 1). However, there are other approaches to EBP that are less active, for example those

which focus on replacing rules of thumb with evidence-based guidelines created by others. Either way, however, the knowledge gained by consulting available research—not just available sources of data or information—is incorporated into practice.

### Challenges to Evidence-Based Practice in Other Fields

Doctors and other health professionals have generally welcomed EBP. It has been the subject of dozens of evaluations and assessments—both as a practice and as a basis for academic instruction (Coomarasamy & Khan, 2004). This work indicates that healthcare professionals believe that it improves patient care. As with any large shift, however, there are challenges. Table 2 summarizes some of the claims made for EBP and its critics, from practical issues such as time limits, lack of skills, and problems with organizational fit, to conceptual issues, such as questions about the character of valid knowledge and the definition of evidence. Some point out that there is no rigorous evidence for the claim that EBP actually improves patient outcomes (Cohen & Hersh, 2004). Key suggestions emanating from these debates in the healthcare sector are for practitioners to develop evidence-based guidelines and protocols, to provide evidence-based summaries of literature, and to integrate training about evidence-based medicine with clinical practice (Coomarasamy & Khan, 2004; McColl *et al.*, 1998).

### EBP Applied to Planning—Helping it Make More Sense

What role can EBP have in planning? As in other fields, there are numerous ways in which evidence can inform practice. As a form of policy making, planning can be enormously complex. For example, policy making has been sometimes referred to as a bricolage—a matter of:

borrowing and copying bits and pieces of ideas from elsewhere, drawing upon and amending locally tried and tested approaches, cannibalizing theories, research, trends, and fashions and not infrequently flailing around for anything at all that looks as if it might work. (Ball, 1998, p. 126, quoted in Nixon *et al.*, 2002, p. 238)

As many authors have explained, policy may often be minimally affected by research evidence (March, 1994; Marris, 1997; Sager & Ravlum, 2005). Over the past century and a half, planning has enjoyed an on-and-off affair with evidence-based policy, particularly in the UK (Innes, 2002; Davoudi, 2006; Faludi & Waterhout, 2006).

We propose evidence-based practice (as opposed to evidence-based policy) has a range of potential effects on planning practice. EBP can inform how planners do their work—how they run meetings, deal with political situations, or assess local conditions. Or it can productively inform the substance of plans and planning initiatives, which may or may not result in policy. In contrast, evidence-based policy, strictly defined in the European (and particularly British) sense, views evidence as a direct justification for policy (Davoudi, 2006). The remainder of the paper focuses on three important issues relevant to the daily and policy work of planning practice:

- What constitutes valid evidence in EBP, and in planning more generally? In what ways does EBP deviate from past perspectives of planning theory?
- In what areas is research available—is there a politics of available research and of areas of practice most likely to embrace the integration of research findings?
- What resources, such as time and political capital, are required to undertake this work?

**Table 2.** Evidence-based practice: claims and critics

Issue	Claim	Critic
Practical issues		
Gaining access to evidence	The Internet and computerized databases are providing increased access, if often for a fee.	Critics point to low awareness of relevant journals, review publications and databases, and little experience in literature searching (McColl <i>et al.</i> , 1998).
Knowing how to read and critique research	Some review of evidence is done by practitioners themselves, who can be trained; librarians and researchers have a role—preparing accessible summaries and systematic reviews (Bauer, 2007; Kronenfeld <i>et al.</i> , 2007).	A study of 302 general practitioners in southern England found doctors were challenged in understanding technical terms used in evidence-based medicine. Well under half had training in critiquing research (McColl <i>et al.</i> , 1998). Often research that answers a specific question directly is not available.
Time to find relevant research	Databases are making research increasingly available; this is an important activity and time should be made available.	A qualitative study of doctors in Iowa found that they lacked time to search for information and doubted the presence of useful information in relevant resources (Ely <i>et al.</i> , 2002).
Organizational fit	Professionals already deal with many forms of information and knowledge from diverse sources; EBP merely adds one more (albeit a rich and rigorous source).	Relative to EBP in social work, critics note that the complex phenomena they address do not fit the rational and organized environment necessary to apply generalized evidence (Webb, 2001). In policy, political considerations may be paramount.
Conceptual issues		
Dealing with conflicting findings in research	In some areas of research there is a growing consensus; in others, findings have a similar direction but the magnitude is unclear; and in others there is little information or much uncertainty. It is better to know this than not.	The presence of “grey zones”, where there is still incomplete or conflicting evidence challenges doctors in their use of EBP (Naylor, 1995).
Systematically compiling multiple studies to assess relevant findings in specific circumstances	The health fields provide “systematic reviews” or rigorous research reviews, though they are not available in all areas.	Difficulties aggregating findings across multiple studies for use as evidence raise concerns about failure to account for variations in individual patients’ backgrounds and characteristics; studies often don’t contain the “treatments” of interest (Feinstein & Horwitz, 1997). Systematic reviews may be narrowly focused and not deal with “why” certain treatments work (Hammersley, 2005; Pawson, 2003).

These help to answer a key question about whether EBP is just a return to old-style rational planning processes, or whether it has something new to offer in terms of an evolving model for planning practice.

### *What Comprises Evidence?*

Planners have long argued for gathering all relevant evidence to inform decisions. Indeed, evidence has informed the practice of urban and regional management and development since before the profession of planning emerged. For example, Charles Booth quantified the social problems of London in 1887, which helped trigger the late-nineteenth-century public health and housing acts; even earlier, the Romans issued a census (reported in the Christian nativity narrative), suggesting that heads of household (Joseph) return to home communities for reasons of taxation (Davoudi, 2006; Faludi & Waterhout, 2006). To give a more recent example, the Professional Code of Ethics of the American Institute of City Planners (AICP) proposes that planners:

- e) ... shall examine the applicability of planning theories, methods, research and practice and standards to the facts and analysis of each particular situation and shall not accept the applicability of a customary solution without first establishing its appropriateness to the situation. (AICP, 2005, Section 3)

The above examples suggest two things. Firstly, planners are already compelled to consider the extent to which theory and research may be relevant to practice. Secondly, planners already examine standard practices critically to ensure their appropriateness to the unique conditions of the context in which they are working. However, at the same time, such directives as the AICP statement provide much latitude regarding what it means to "examine the applicability of research", what comprises evidence, and how we define the information and knowledge on which claims or arguments can be based. For further interpretation, it becomes important to define terms and provide context to differentiate among information, knowledge, and research evidence.

For a few decades the field of planning has been engaged with a vital debate about valid knowledge, in particular, the relationship between scientific and technical knowledge and local knowledge, and questions over whose local knowledge should be included in planning processes (Rydin, 2007). Participatory planning, advocacy planning, progressive planning, radical planning, the communicative and postmodern turns, and deliberative planning, all engage with this issue, typically arguing for a broader view of evidence, knowledge, and information in planning (Flyvbjerg, 1998; Forester, 1989; Friedmann, 1987; Healey, 1997; Innes, 2004; Sandercock & Forsyth, 1992; Umemoto, 2001). There has been some confusion about multiple forms of knowledge, especially how to deal with conflicts between the different values and ethical considerations inherent within multiple voices, but typically, diversity of knowledge has been valued (Rydin, 2007, p. 56). These approaches can appeal to various publics and decision makers, who are interested in finding a compelling story to tell about the future (Marris, 1997; Sager & Ravlum, 2005; Throgmorton, 1996).

At the same time the rational model, i.e. the traditional approach that involves setting goals, collecting and analyzing data, generating alternatives, and making plans or policies, has also evolved. Work on the limits to rationality is now many decades old, and the areas of planning that intersect with science studies sees continuing debates in this area (Banfield, 1955; Etzioni, 1967; Lindblom, 1959; March, 1978; Rittel & Webber, 1973; Sager & Ravlum, 2005). Rational models continue to find favor when largely technical decisions

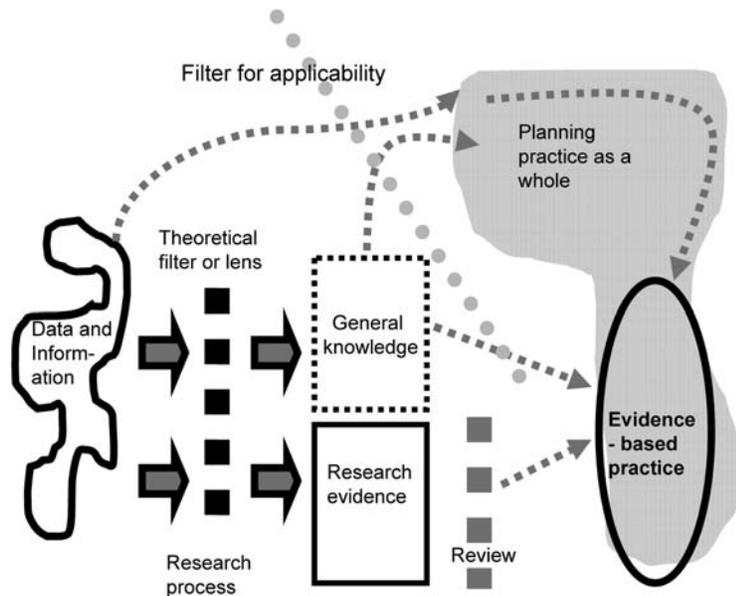
are made (e.g., hydrology, and to some extent, transportation) although even they have been modified to acknowledge other perspectives, for example in the move to engage stakeholders in strategic planning (Campbell & Marshall, 2000). Such approaches are more controversial in contexts involving issues that are difficult to define and measure, such as those addressing social, political, or aesthetic issues. In these cases, the various alternative models above (e.g., communicative, advocacy, strategic) have provided other options.

Before examining how EBP can fit into either rational planning or alternative processes, it is important to distinguish information from knowledge (and evidence). The boundaries between the concepts of evidence and information, for instance, are blurred: a government report addressing an agenda centered on evidence-based policy and practice in the UK described evidence in a way that included what we would term “information”, as “expert knowledge; published research, existing statistics, stakeholder consultations, previous policy evaluations, the Internet; outcomes from consultations; costings of policy options; output from economic and statistical modeling” (SPMT, 1999). Indicators, often favored for their quantitative nature, are frequently used as evidence to justify policy decisions (Wong, 2006), and the use of descriptive data and trend statistics is among the most enduring practices in planning. For example, a relatively straightforward use of information might involve the following applications:

- Using Census data to estimate the residential population within a supposed “walking distance” to a proposed grocery store
- Measuring the groundwater pollution for a particular area that may be affected by contaminating land uses
- Describing the housing vacancy rates for various housing projects.

We contend, however, that this broad definition of “evidence” to include facts, data, or information, does not constitute “knowledge”. Knowledge implies a larger theory of the ways in which certain types of information mesh with other kinds of information, perhaps in the context of causal relationships (Rydin, 2007, p. 53) or in a social learning context in which knowledge is jointly created (Pahl-Wostl & Hare, 2004). Such distinctions along a continuum are not terribly discrete, but they are meaningful, and recognizing this is key to the propositions in this paper. For EPB, facts, data, and other types of information do not constitute adequate evidence: knowledge is also needed.

Figure 1 demonstrates one way of conceptualizing the relationship between data and information as they are transformed into knowledge and then used in research. Such a process is not unlike that proposed in “an overview of understanding” as presented by Shedroff (in Wurman, 2001, p. 27). Furthermore, it conforms with Davoudi’s (2006) interpretation of evidence as “the available body of facts or information indicating whether a belief or proposition is true or valid”, a definition drawn originally from the Oxford English Dictionary. Davoudi (2006, p. 20) infers from this that “facts or information are not themselves evidence, they become evidence when they are used in conjunction with other facts to prove or disprove a proposition . . . [it] is not limited to research findings and includes multiples sources of different forms of formal and informal, expert and experiential, and systematic and tacit knowledge.” The culmination of filtering through a series of lenses produces research-based evidence, although other forms of evidence (both knowledge and information) would also be used in planning, even in EBP. In other words, information and knowledge both have a place in broader planning practice.



**Figure 1.** Relationships between information, knowledge, research evidence, and practice.

In contrast to “naked” facts and data, “research evidence” places information in a wider context appropriate to the field of planning. To illustrate this we can create parallel examples to those outlined above, showing what research evidence adds to quantitative and qualitative information. For instance, it can:

- More reliably discern the percentage of people within discrete demographics of residents (the old, the young, those on low incomes, those with dependants) who might be willing to walk for various types of groceries or services
- Recognize the likely impact of the pollutants on nearby populations
- Determine the degree to which increased housing vacancy is a product of drug trafficking, or the lack of an active tenants group, or other factors (e.g., cost of housing)

While EBP came initially from medicine, which focuses on experimental science, it can also be used in other fields which possess more diverse research methods to create useful research evidence. Even where EBP uses research evidence from a narrow technical base, the total planning process almost always integrates this with a wider range of information and knowledge, including local knowledge, current data, and information generated through deliberative processes. Overall, determining what comprises useful or valid evidence depends partly on the question that is asked, and partly on whether one is focusing closely on the evidence-based practice model or the larger planning process of which it is typically a part.

However, practicing planners typically seek information, knowledge, or better yet, solutions about a situation or concrete problem. They are less interested reams of caveats or the balance of findings from multiple studies. They want to know, for example, how far away from major roadways they should place schools to avoid pollution effects. In answering such a question, practitioners may happen to locate helpful findings from some formal research output. More often, though, they rely on experience and more informal investigations of the problem, and rules of thumb or best practices developed

and applied by others (Hack, 1984). This approach to practice has much to commend it. Proponents of EBP suggest that it can be used by practitioners to complement, and not to replace, such approaches, by tapping into more formal, published, peer-reviewed research alongside other activities. They can thereby beneficially include a broad array of research in addition to more narrowly cast, traditional scientific evidence, as long as the former conforms to rigorous research methods.

But the question remains: how can research evidence become more useful to planning? As Bohme (2002) mentions, forms of evidence vary between “heavily academic research materials, more or less quantifiable evaluations, and punchy policy messages.” Table 3 elaborates on these three types of evidence, along with some others as examples, suggesting a range of evidentiary sources for both professional and citizen planners and their respective strengths and weaknesses.

A first type of evidence is the anecdote or personal experience, where an ordinary citizen or a professional observes a particular phenomenon (e.g. the configuration of a certain intersection leading to several near misses in terms of bicycle or pedestrian crashes). The individual may communicate such an observation to others; shortly thereafter, it becomes collective knowledge (e.g., the intersection of Franklin Street and 19th Avenue is dangerous for cyclists). Where this happens several times over, the various experiences persist and knowledge is created. Alternatively, a senior individual in a particular field (e.g., an academic, practitioner or consultant) may, after years of digesting reports on related phenomena, suggest that a relationship or threshold that holds true (e.g., the finding that people are likely to walk, on average, one-quarter mile, which Richard Untermaier observed in his 1984 book *Accommodating the Pedestrian*). People respect the knowledge that this individual brings to a problem and assume that their

**Table 3.** Strengths and limits of evidence in planning practice and research

Source	Strengths	Limitations
Anecdote and personal experience	Specific, personal, rich; can tap into the experiences of disempowered groups and reflect local concerns and situations	Difficult to transfer, immediacy may obscure alternative instances
Professional experience	Reflects multiple experiences, reflective practice, and growing expertise	May not be systematically assessed; uneven coverage of available information
Focused case studies or precedents (not peer reviewed)	In-depth understanding of a single setting, usually examining multiple dimensions and drawing out relevant lessons	Usually a single example in a single setting; may be difficult to transfer to new situations
Peer reviewed empirical studies (formal research)	Systematic, tested for contribution to knowledge—may be qualitative or quantitative	Typically context-specific (confined to a small number of situations, places, or datasets); not available for all important questions
Peer reviewed theoretical analyses (formal research)	Provide an overall framework for an issue; may be based on empirical work bringing it together into a coherent whole	May be largely speculative designed for testing and experimentation rather than as a basis for action
Systematic review/ report by a national research council	Provides an overview of the available rigorously collected evidence, on balance	Difficult to undertake on a comprehensive scale; relies on available studies; not available in all subject areas due to lack of research on some questions

perspective is sufficiently deep to allow for perceptive generalizations, prescriptions and recommendations.

Another approach, often used in planning, is to examine systematically a key case or precedent to learn lessons. While such case studies may form the basis of research studies, here we are talking about typical practice-oriented cases, conducted through site visits, interviews, and literature searches that are thorough but do not conform to the processes of empirical research (e.g., the “Good Practice Guides” identified by Healy, 2002). Such cases have many valuable attributes and can be instructive and inspiring.

Building a research approach, as outlined in Table 1, involves answering a question of general interest, providing systematically collected evidence, building on previous work, making a compelling argument, and documenting the work so it can be replicated, peer reviewed, disseminated, and ultimately, so it can contribute to knowledge. There are a number of approaches to empirical research, some close to what is known as a scientific method (developing theory, testing the theory, rejecting the null hypothesis, etc.) but others using different but equally systematic approaches, including more qualitative approaches. One rigorous study using such an approach is good; two studies are better, and so on. Eventually, numerous studies provide a cumulative body of research evidence related to key questions. Research can also be theoretical—building a proposition from the results of empirical studies, or proposing a speculative theory as the basis for future research. The former could be part of the evidence base for EBP.

Finally, if there is a body of accumulated knowledge or evidence there may be a summary assessment. In the field of health the systematic review fulfils this need, carefully assessing the available studies on a specific topic. In some subject areas, such work may be done by a national research council (e.g., in the USA the Institute of Medicine, Transportation Research Board).

The implicit understanding from the above is that more research evidence is better than less, although, as with peeling the layers of an onion, the more layers that are peeled away, the more unknowns are revealed. Such is the case with land use/travel behavior research between the late 1990s and early 2000s. After nearly three decades of increasingly sophisticated research using ever improved datasets, statistical methods, and techniques for geographic analysis, Boarnet and Crane (2000, p. 14) stated that: “our conclusion is not that urban design and transportation behavior are not linked, or that urban design should never be used as transportation policy. Rather, we conclude that we know too little about the transportation aspects of the built environment.” This is a rather unsettling result, especially given the reams of research devoted to the topic. Similarly, in the context of the debate about the supposed merits of high density residential development, Davoudi (2006) contends that available evidence is still inconclusive and open to different interpretations. These reflections on the state of the knowledge about well-studied phenomena point to the need to distinguish between specific findings of one study versus understanding general patterns of evidence. Furthermore, they suggest the need to balance research and other forms of evidence, information, and knowledge, in order to act.

In the end, all the forms of evidence have utility, but it is crucial to understand their limitations. For example, too often a suggested policy action is justified with reference to a single source of evidence that fits the practitioner’s or author’s preconception. Cases, anecdotes, or even research studies are cherry-picked to fit a situation or idea. This is perhaps the biggest current problem with the use of research evidence: when practitioners use only a single source, unworried by conflicting evidence because they ignore evidence that does not agree with their position. As one reviewer commented, several approaches to planning that claim to be evidence-based have a very thin base of evidence which is used

to justify pre-existing positions. The “evidence” part in EBP involves weighing the quality and content of all studies; taking advantage of systematic, comprehensive, and balanced research summaries; while also incorporating tried and true, or locally relevant, methods for specific environments and contexts. The challenge then lies in developing tools or proposing guidelines that would not only be applicable for day to day planning practice but also respect research standards.

#### *Where is Research Available?*

Using research evidence requires it to be available, and in planning, as in most fields, some topics have attracted more research time and funding than others. Different planning specializations or research areas have different limitations:

- **Availability:** Some areas—such as motorized transportation—routinely attract more research funding than others, such as service design for homeless people. Research is unequally available, suggesting that is important to have mechanisms for doing work in areas where the evidence base is slim but the need for action is great.
- **Applicability:** Research is usually conducted in one environment under some specified conditions, posing possible challenges when employing it to inform policies that apply to a different environment, with different populations and conditions. For example, concerns about the applicability of research evidence related to walkable environments in warmer climates often arise when attempts are made to apply it in colder locations.
- **Strength, size, and specificity of findings:** Some topics, such as the association between seeing plants and improved mental health are well established but hard to quantify; others may be quantifiable but with effects that are small. Some topics have only been studied once. These have very different implications for being able to use findings in EBP.

Overall, these problems point to the need for practitioners to be skilled in using research evidence and to make evidence-based practice only one of a number of planning strategies used. Making evidence accessible requires better communication channels between policy and research communities.

#### *Are There Resources for Evidence-Based Practice?*

EBP requires resources on the part of planners but also on the part of other individuals involved in planning activities. Planners need time and skills to work with evidence. If they are to create their own research assessments, they also need access to what can be rather expensive research databases, and knowledge about how to analyze and critique such research. However, if well supported, this does not seem to be an insurmountable issue for professional planners: in Europe special research observatories have been set up at the national and European Union level for this purpose (Faludi & Waterhout, 2006). Other important participants in the planning process, such as citizen planners, are perhaps likely to experience more significant limitations in terms of time, money, and skill.

One of the most problematic sticking points for EBP is the question of whether there is a general willingness to use evidence, particularly if it contradicts entrenched positions (Sager & Ravlum, 2005). That is, there may be a lack of the resources of interest and will. As March (1994, p. 226) explains, political “decision makers gather information and do not use it; ask for more information and ignore it; make decisions and look for relevant information afterwards; and, collect and process a great deal of information that has little or no direct relevance to decisions.” Sager and Ravlum (2005, pp. 55–56) confirm this from

their own highly detailed case study of parliamentary decision making in the context of transportation-related projects in Norway, where elaborate models and impact assessments were either ignored in favor of decisions that made more sense politically, or were used by the parliamentary committee to signal a commitment to rationality and justify prior decisions.

### **Application: Creating Evidence-Based Tools for Integrating Health Issues in Planning**

Our example, demonstrating the utility of EBP, is derived from the work of Design for Health (for more information about the project, its context and tools, see: [www.designforhealth.net](http://www.designforhealth.net)). Health is a central topic in planning circles these days and communities are wrestling with whether to implement planning prescriptions to encourage the building of healthier environments, and how these might work in practice. There are many advocacy reports to draw from, and these are increasingly complemented with peer-reviewed research.

The Design for Health project, initially based at the University of Minnesota, was developed to provide grant-funded communities in the state of Minnesota with technical assistance to integrate health into their comprehensive plans and planning policies. This project involved examining relationships between the built environment and health, and offering practicing planners tools to account for these relationships. Such a task required a number of distinct elements, including assessing existing research on the connections between health and the built environment, and translating the most substantial findings into recommendations for planning. There were several key products associated with this effort.

- Research summaries on major health topics were complemented by information sheets demonstrating how to apply the findings in planning language: goals, policies and ordinances were discussed (Design for Health, 2008a, 2008b). These evidence-based summaries were targeted at personnel in community planning and design, but also at health officials, elected officials, and professionals working within more specialized niches (e.g., transportation, water quality), but interested in the connection between the built environment and human health. The summaries distinguished between findings that were more certain (i.e., where multiple studies converged), and those findings that were more unclear or even up in the air.
- A suite of health impact assessment (HIA) tools that translated key research findings into measurable criteria to evaluate plans and policies as well as providing structured and information-rich participatory formats for discussing health issues (Design for Health, 2008c). Many grantees were required to use one of these tools.
- An events series where over a dozen national and international experts presented papers. Grantees were required to send staff members to these events, although not all did.
- A website containing all the above information (including speaker PowerPoint files), downloadable images, and links to other information sources.
- On-call technical assistance from a project team who could answer specific questions and review draft planning documents.

All but one of the communities did some work to incorporate health issues into comprehensive and transportation planning, using new methods or citing new sources. This experience, however, demonstrated a number of challenges relating to developing an evidence-based approach to planning, interpreting the evidence from multiple disciplines,

and translating it to practitioners. Key issues in assembling the evidence are listed in Table 4 and include challenges faced by the technical assistance team and by personnel working in local governments. In contrast with Table 2, gaining access to evidence, knowing how to read research and having time to do so were less important for this funded university-based team. Rather, many of the problems faced in this project reflected the nature of the evidence base itself and included issues surrounding the need to deal with different methods, sample populations, and varying definitions of key concepts, as well as problems related to unclear causal relations and conflicts between the strength of the conclusions reached by different pieces of research.

For example, in the area of land use and transportation, evidence makes it clear that urban form and transportation are linked. However, that does not mean that modifying urban form is the most effective strategy to solving transportation problems (e.g. congestion); in fact, there are many discrete topics in this area where research evidence is still emerging (e.g. new data on how many people will walk over half a mile to specific destinations). These conflicts can be solved by being clear about what was known and what was not, with subtitles along these lines used in the research summaries. However, this was not always satisfying for practitioners wanting more clear-cut answers.

Beyond assembling and assessing the evidence there was one major practical problem: getting partner communities to use the research evidence, even though they had been funded to do so at the level in the tens of thousands of dollars. A few cities where staff and elected officials were excited about the topics were imaginative about incorporating

**Table 4.** Key challenges assessing evidence in evidence-based practice in planning

Issue	Example
Interpreting varying methodological approaches	Research on the connection between air quality and the built environment has used varying methods to determine the appropriate buffer distance to reduce air pollution impacts from major roadways. Studies vary on distances measured, size of roadway, type of pollutants, and contributing factors (e.g. wind) (Hitchins <i>et al.</i> , 2000, Janssen <i>et al.</i> , 1997, Roorda-Knape <i>et al.</i> , 1998)
Clarifying multiple sample sizes and characteristics	In interpreting findings related to the built environment and mental health there is general evidence that exposure to green space can improve mental health, but responses vary across sub-populations in terms of age, place of residence, ethnicity, and other factors (Forsyth & Musacchio, 2005; Gobster, 2002; Kaplan & Kaplan, 1989; Parsons <i>et al.</i> , 1998; Ulrich <i>et al.</i> , 1991)
Addressing divergent definitions for key planning, design, and health concepts	Studies examining the relationship between social capital and health have represented social capital by factors such as trust, knowing one's neighbors, spending an evening with someone from one's neighborhood, contacting elected officials, participating in a protest, similarity of values with neighbors, perceived community friendliness, and voting in elections (Brisson & Usher, 2005; Glaeser & Sacerdote, 2000; Leyden, 2003; Podobnik, 2002; Williamson, 2004). The definition of "high" density also varied by almost 100-fold just in the social capital literature (Greiner <i>et al.</i> , 2004; Williamson, 2004)
Cause and effect	While some research findings point to clear quantitative relationships, other research establishes only correlations between aspects of the built environment and overall health or particular health outcomes. For example, in the area of physical activity, many studies have found a relationship between environmental features and travel walking but recent work on total physical activity has had weak and mixed findings, particularly when controlling for socioeconomic variables (Wendel-Vos <i>et al.</i> , 2007)
Reflecting the strength of the evidence	In many cases in the planning area there is only one study
Addressing conflicting findings	Relative to water quality and health, there is substantial agreement that buffers adjacent to surface water bodies can improve water quality, but studies suggest different dimensions when it comes to sufficient buffer width (Haycock & Muscutt, 1995, Phillips, 1989, Steedman, 1988, Tufford, 1998)

findings from evidence into the planning process as background materials and information for participants. They used health impact assessment tools, in whole and in part, to raise awareness. They considered the special needs of vulnerable populations such as children, seniors, and those with low-incomes. But with some communities, incorporating evidence involved a great deal of persuasion on the part of the resource team. For example, one participatory workshop required participants to be given access to research-based health information so they could combine this with local knowledge, but it was hard to persuade some communities to provide such information, even when it was given to them in a highly accessible form. Others selected the findings of single studies that supported their pre-existing positions, and promoted a strong role for planning affecting health positively, rather than using reviews produced for them that presented the balance of findings and showed less clear effects. (Some on the team even felt the reviews pushed the findings further than they might warrant, but that this was still not strong enough for the practitioners).

An ongoing review of all plans produced by the partners (some comprehensive or general plans, others transportation plans) showed that some locations embraced health throughout the plan, but others only added health language to goals and objectives without changing the substance of the planning strategy. One mentioned health just three times in a 200-page plan (specifically ecological health, healthy businesses, and the traditional justification for planning in the USA as protecting “health, safety, and welfare”). Obviously good research evidence is not sufficient by itself, but instead needs to coincide with organizational culture and political goals. Professionals also need to be willing to question their own beliefs.

The lack of interest in research is a problem of planning decision-making that has been highlighted by others (see also Marris, 1997; Sager & Ravlum, 2005). However, some communities did find accessible research to be useful when engaging with planning issues. The products that were developed to help these planners did not suggest that the research was the “last word” in authoritative pronouncement on the issue, but instead helped to make findings more accessible, thereby providing one model for evidence-based practice in planning.

### **Assessment: Making the Most of EBP in Planning?**

The divide between research and practice is wide in the field of planning. Practitioners yearn for researchers to do a better job in making their findings applicable to day-to-day situations; conversely, researchers yearn for practitioners who can find time to read and incorporate their research outcomes. It is easy to suggest that EBP requires both sides to reach out more, and that this additional effort can potentially serve to narrow such a gulf and better bridge research to practice. A suitable way forward is to develop better, ongoing interaction between evidence providers and potential evidence users (Nutley *et al.*, 2002) and pressure on this front may improve the uptake of evidence in practice.

But such suggestions are not uncontroversial. In other fields EPB has met with a number of conceptual and practical objections—from lack of time and skills to a narrowing of focus to what has been proven in multiple studies. The described example of using EBP in the area of the built environment and health demonstrated some of these strengths and challenges. This last section assesses the merits of EBP as an integral to an approach to planning, either in whole or in part.

Existing planning policy and practice is based on several inputs. Planners practice what they learned in school, what their predecessor practiced, or replicate what are considered

to be best practices. Such information and knowledge are helpful but there is value to extending these inputs to include research evidence. If not a new approach altogether, EBP suggests a greater appreciation for the idea that planning policy and practice could be based on research evidence as well as other sorts of knowledge and information. This approach encourages practitioners to consider how research might inform what they do. In many respects, it challenges the current status quo and adds the additional burden of uncovering a research base which may rarely be summarized, might not be applicable, and could even present contradictory findings. But planning has a rich history of initiating programs or policies that are politically or socially acceptable but that often prove to be ineffective in advancing the cause they were originally intended to advance when evaluated (e.g., new urbanism to curb car use, housing voucher programs to solve poverty).

EBP helps avoid a few of these problems. The example of Design for Health suggests a strategic way to inject health into comprehensive plans, which helps the practice-based community, yet stays true to the integrity of the research. At the same time it raises some additional questions about key theoretical issues, such as planning process, the politics of planning, and the ethical products of planning practice.

**Process:** It is difficult to locate, synthesize, and communicate research, and then to translate it into proposals for action. It takes time away from other activities conducted by planners. It also takes skill on the part of planners to make evidence available to local community members, to incorporate it into standard planning tasks, and to change policies when new evidence emerges.

- **Politics:** In some areas—such as human health, ecological health, and transportation—there is a wealth of ongoing research and a great deal of need for action. However, other important areas that are less valued by powerful decision makers and research funders, such as homelessness, have fewer research studies available. Some people do not have access to research libraries, and, as several studies have demonstrated, even when given sophisticated evidence politicians don't necessarily use it (Sager & Ravlum, 2005). Acknowledging these political issues related to EBP, elevates the importance of providing research summaries to sift through the balance of evidence and acknowledge variations in methods, measures, and the strength of results. Making research more accessible beyond a narrow range of people can avoid the problem of busy practitioners grabbing the most accessible study. However, even good summaries may not be accepted in the political process.
- **Products:** Compared with failures, research is inexpensive. However, might EBP suppress innovation, de-emphasize local knowledge, or deflect debates away from a focus on the good in planning? An argument could be made that innovative and progressive policy might be stifled with over-reliance on EBP, particularly where there is conflicting evidence, or a lack of it. It may be necessary to guard against situations where the insistence on providing evidence might be simply used as an excuse to terminate initiatives which have either not yet been evaluated or which, because of their nature, are very difficult to evaluate.

Finally, planning theorists need to consider their own perspectives on technical, research knowledge. In the light of a growing volume of urban planning research, how can planning theory deal with issues of knowledge? Can planning theorists use EBP to help practitioners make more use of the growing body of research in planning theory? These questions encourage reflection on what we know and what we do not know as planners, and point to the need to be thoughtful about the evidence base of

planning decisions. In this regard, Gordon Childe's (1936) statement "On the evidence available today the balance of probability favors the view that..." is likely the most certainty we can hope for.

## Notes

1. Relevant professions include business (Pfeffer & Sutton, 2006b), nursing (Dale, 2005; French, 2002), social work (Rubin, 2008; Webb, 2001), education (Davies, 1999; Slavin, 2002), interior design (InformeDesign, 2008), public health (Brownson *et al.*, 2003), and medicine (Coomarasamy & Khan, 2004; Sackett *et al.*, 1996).
2. Research is a form of scholarship or "the production and transmission of culturally valued, specialized knowledge" typically with clear goals, methods, broader significance, documentation and dissemination, and peer review (Diamond, 2002; Humphreys, 1997, p. 1). It is possible to practice in a scholarly way, just as it is possible to undertake the scholarship of teaching, though most practice is not scholarship (Boyer, 1990; Rice, 2002).

## References

- Allison, G. & Zelikow, P. (1999) *Essence of Decision*, 2nd edn (New York, Longman).
- AICP (American Institute of Certified Planners) (2005) *AICP Code of Ethics and Professional Conduct*. Available at <http://www.planning.org/ethics/ethicscode.htm>.
- Banfield, E. (1955) Note on conceptual scheme, in: M. Meyerson & E. Banfield (Eds) *Politics, Planning and the Public Interest* (Glencoe, Free Press).
- Bauer, R.M. (2007) Evidence-based practice in psychology: Implications for research and training, *Journal of Clinical Psychology*, 63(7), pp. 685–694.
- Baum, H. (1997) Social science, social work, and surgery: teaching what students need to practice planning, *Journal of the American Planning Association*, 63(2), pp. 179–188.
- Birch, E. (2001) Practitioners and the art of planning, *Journal of Planning Education & Research*, 20, pp. 407–422.
- Boarnet, M. & Crane, R. (2000) *Travel by Design* (New York, Oxford University Press).
- Bohme, K. (2002) Much ado about evidence: reflections from policy making in the European Union, *Planning Theory & Practice*, 3(1), pp. 98–101.
- Boyer, E. (1990) *Scholarship Reconsidered* (Menlo Park, CA, Carnegie Foundation for the Advancement of Teaching).
- Brisson, D.S. & Usher, C.L. (2005) Bonding social capital in low-income neighborhoods, *Family Relations*, 54(5), pp. 644–653.
- Brownson, R.C., Baker, E.A., Leet, T.L. & Gillespie, K.N. (2003) *Evidence-Based Public Health* (New York, Oxford University Press).
- Campbell, H. & Marshall, R. (2000) Public involvement in planning: Looking beyond the one to the many, *International Planning Studies*, 5(3), pp. 322–344.
- Childe, V.G. (1936, 1966) *Man Makes Himself*, 4th edn (London, Collins).
- Cohen, A. & Hersch, W. (2004) Criticisms of evidence-based medicine, *Evidence-based Cardiovascular Medicine*, 8, pp. 197–198.
- Coomarasamy, A. & Khan, K.S. (2004) What is the evidence that postgraduate teaching in evidence based medicine changes anything? A systematic review, *British Medical Journal*, 329, pp. 1017–1022.
- Corburn, J. (2005) *Street Science: Community Knowledge and Environmental Health Justice* (Cambridge, MA, MIT Press).
- Dale, A.E. (2005) Evidence-based practice: compatibility with nursing, *Nursing Standard*, 19(40), pp. 48–53.
- Davies, P. (1999) What is evidence-based education?, *British Journal of Educational Studies*, 47(20), pp. 108–121.
- Design for Health (2008a) *Research Summaries/Key Questions*. Available at <http://www.informeddesign.umn.edu/> (accessed 1 December 2009).
- Design for Health (2008b) *Planning Information Sheets*. Available at <http://www.informeddesign.umn.edu/> (accessed 1 December 2009).
- Design for Health (2008c) *Health Impact Assessment*. Available at <http://www.informeddesign.umn.edu/> (accessed 1 December 2009).
- Diamond, R. (2002) Defining scholarship for the twenty-first century, in: K. Zahorski (Ed.) *Scholarship in the Postmodern Era* (San Francisco, Jossey Bass).
- Davoudi, S. (2006) Evidence-based planning: rhetoric and reality, *DISP*, 165(2), pp. 14–24.

- Ely, J.W., Osherooff, J.A., Ebell, M.H., Chambliss, M.L., Vinson, D.C., Stevermer, J.J. & Pifer, E.A. (2002) Obstacles to answering doctors' questions about patient care with evidence: qualitative study, *British Medical Journal*, 324, pp. 710–717.
- Etzioni, A. (1967) Mixed-scanning: a "third" approach to decision-making, *Public Administration Review*, 27, pp. 385–392.
- Faludi, A. (1973) *Planning Theory* (Oxford, Pergamon Press).
- Faludi, A. (2007) Making sense of the "territorial agenda of the European Union", *European Journal of Spatial Development*, 25, pp. 1–21. Available at <http://www.nordregio.se/EJSD/refereed25.pdf>.
- Faludi, A. & Waterhout, B. (2006) Introducing evidence-based planning, *disP*, 165(2), pp. 4–13.
- Feinstein, A.R. & Horwitz, R.I. (1997) Problems in the "evidence" of "evidence-based medicine", *American Journal of Medicine*, 103(6), pp. 529–535.
- Flyvbjerg, B. (1998) *Rationality and Power: Democracy in Practice* (Chicago, University of Chicago Press).
- Forester, J. (1989) *Planning in the Face of Power* (Berkeley, CA, University of California Press).
- Forester, J. (1999) *The Deliberative Practitioner* (Cambridge, MA, MIT Press).
- Forsyth, A. & Musacchio, L. (2005) *Designing Small Parks* (Hoboken, NJ, John Wiley).
- Forsyth, A. (2007) Innovation in urban design: does research help?, *Journal of Urban Design*, 12(3), pp. 461–473.
- Forsyth, A. & Crewe, K. (2006) Research in environmental design: definitions and limits, *Journal of Architectural & Planning Research*, 23(2), pp. 160–175.
- French, P. (2002) What is the evidence on evidence-based nursing? An epistemological concern, *Journal of Advanced Nursing*, 37(3), pp. 250–257.
- Friedmann, J. (1987) *Planning in the Public Domain* (Princeton, NJ, Princeton University Press).
- Garcia, M. (1997) Science and the people: a response to science by the people, *Journal of Planning Education & Research*, 16(4), pp. 299–300.
- Glaeser, E. & Sacerdote, B. (2000) The social consequences of housing, *Journal of Housing Economics*, 9, pp. 1–23.
- Greiner, K.A., Chaoyang, L., Kawachi, I., Hunt, D.C. & Ahluwalia, J.S. (2004) The relationships of social participation and community ratings to health and health behaviors in areas with high and low population density, *Social Science & Medicine*, 59(11), pp. 2303–2312.
- Groat, L. & Wang, D. (2002) *Architectural Research Methods* (New York, John Wiley).
- Gobster, P. (2002) Managing urban parks for a racially and ethnically diverse clientele, *Leisure Sciences*, 24, pp. 143–159.
- Hack, G. (1984) Research for urban design, in: J. Snyder (Ed.) *Architectural Research* (New York, Van Nostrand Reinhold).
- Hammersley, M. (2005) Is the evidence-based practice movement doing more good than harm? Reflections on Iain Chalmers' case for research-based policy making and practice, *Evidence & Policy*, 1(1), pp. 85–100.
- Haycock, N.E. & Muscutt, A.D. (1995) Landscape management strategies for the control of diffuse pollution, *Landscape & Urban Planning*, 31(1–3), pp. 313–321.
- Healy, A. (2002) Evidence-based policy—the latest form of inertia and control?, *Planning Theory & Practice*, 3(1), pp. 97–98.
- Healey, P. (1997) *Collaborative Planning* (London, McMillan).
- Heiman, M. (1997) Science by the people: grassroots environmental monitoring and debate over scientific expertise, *Journal of Planning Education & Research*, 16, pp. 291–299.
- Hitchins, J., Morawska, L., Wolff, R. & Gilbert, D. (2000) Concentrations of submicrometre particles from vehicle emissions near a major road, *Atmospheric Environment*, 34(1), pp. 51–59.
- Hopkins, L. (2001) Planning as science: engaging disagreement, *Journal of Planning Education & Research*, 20, pp. 399–406.
- Humphreys, S.C. (1997) Introduction: let's hear it for the magpies, in: S.C. Humphreys (Ed.) *Cultures of Scholarship* (Ann Arbor, University of Michigan Press).
- InformDesign (2008) *InformDesign: Where Research Informs Design*. Available at <http://www.informedesign.umn.edu/> (accessed 1 December 2009).
- Innes de Neufville, J. (1983) Planning theory and practice: bridging the gap, *Journal of Planning Education & Research*, 3(1), pp. 35–45.
- Innes, J. (2002) Improving policy making with information, *Planning Theory & Practice*, 3(1), pp. 102–104.
- Innes, J. (2004) Consensus building: clarifications for the critics, *Planning Theory*, 3(1), pp. 5–20.
- Innes, J. (1998) Information in communicative planning, *Journal of the American Planning Association*, 64(1), pp. 52–63.
- Janssen, N.A.H., Van Mansom, D., Van Der Jagt, K., Harssema, H. & Hoek, G. (1997) Mass concentration and elemental composition of airborne particulate matter at street and background locations, *Atmospheric Environment*, 31(8), pp. 1185–1193.

- Kaplan, R. & Kaplan, S. (1989) *The Experience of Nature: A Psychological Perspective* (Cambridge, Cambridge University Press).
- Kronenfeld, M., Stephenson, P.L., Nail-Chiwetalu, B., Tweed, E.M., Sauders, E.L., McLeod, T.C. *et al.* (2007) Review for librarians of evidence-based practice in nursing and the allied health professions in the United States, *Journal of the Medical Library Association*, 95(4), pp. 394–407.
- Lawson, B. (2006) *How Designers Think*, 4th edn (Oxford, Architectural Press).
- Leyden, K.M. (2003) Social capital and the built environment: the importance of walkable neighborhoods, *American Journal of Public Health*, 93(9), pp. 1546–1551.
- Lindblom, C. (1959) The science of muddling through, *Public Administration Review*, 19, pp. 79–88.
- March, J. (1978) Bounded rationality, ambiguity, and the engineering of choice, *The Bell Journal of Economics*, 9, pp. 587–608.
- March, J. (1994) *A Primer on Decision Making* (New York, Free Press).
- Marris, P. (1997) *Witnesses, Engineers, and Storytellers: Using Research for Social Policy and Action* (College Park, MD, University of Maryland Urban Studies and Planning Program).
- McColl, A., Smith, H., White, P. & Field, J. (1998) General practitioners' perceptions of the route to evidence-based medicine: a questionnaire survey, *British Medical Journal*, 316, pp. 361–365.
- Naylor, C.D. (1995) Grey zones of clinical practice: some limits to evidence-based medicine, *Lancet*, 345, pp. 840–842.
- Nixon, J., Walker, M. & Baron, S. (2002) From Washington Heights to the Raploch: evidence, mediation and the genealogy of policy, *Social Policy & Society*, 1(3), pp. 237–246.
- Nutley, S.M., Walter, I. & Davies, H.T.O. (2003) From knowing to doing: a framework for understanding the evidence-into-practice agenda, *Evaluation*, 9(2), pp. 125–148.
- Nutley, S., Davies, H. & Walter, I. (2002) Evidence-based policy and practice: cross sector lessons from the UK. ESRC UK Centre for Evidence Based Policy and Practice. Working paper 9. Available at <http://kcl.qc.uk/content/1/c6/03/46/00/wp9b.pdf> (accessed 1 December 2009).
- Ozawa, C.P. & Seltzer, E.P. (1999) Taking our bearings: mapping a relationship among planning practice, theory, and education, *Journal of Planning Education & Research*, 18(3), pp. 257–266.
- Pahl-Wostl, C. & Hare, M. (2004) Processes for social learning in integrated resources management, *Journal of Community & Applied Social Psychology*, 14(3), pp. 193–206.
- Parsons, R., Tassinary, L.G., Ulrich, R.S., Hebl, M.R. & Grossman-Alexander, M. (1998) The view from the road: implications for stress recovery and immunization, *Journal of Environmental Psychology*, 18(2), pp. 113–140.
- Pawson, R. (2002) Evidence-based policy: the promise of “realist synthesis”, *Evaluation*, 8, pp. 340–358.
- Pawson, R. (2003) Assessing the quality of evidence in evidence-based policy: why, how and when? Paper presented at the ESRC Research Methods Programme Conference, Buxton, May.
- Pawson, R. (2006) *Evidence Based Policy: A Realist Perspective* (London, Sage).
- Pfeffer, J. & Sutton, R.I. (2006a) Evidence-based management, *Harvard Business Review*, 84(7/8), p. 13.
- Pfeffer, J. & Sutton, R.I. (2006b) *Hard Facts, Dangerous Half-Truths and Total Nonsense* (Cambridge, MA, Harvard Business School Press).
- Phillips, J. (1989) Nonpoint source pollution control effectiveness of riparian forests along a coastal plain river, *Journal of Hydrology*, 110(3–4), pp. 221–237.
- Podobnik, B. (2002) New Urbanism and the generation of social capital: Evidence from Orenco Station, *National Civic Review*, 91(3), pp. 245–255.
- Rice, R.E. (2002) Beyond scholarship reconsidered: toward an enlarged vision of the scholarly work of faculty members, in: K. Zahorski (Ed.) *Scholarship in the Postmodern Era* (San Francisco, Jossey Bass).
- Rittel, H. & Webber, M. (1973) Dilemmas in a general theory of planning, *Policy Sciences*, 4(2), pp. 155–169.
- Roorda-Knape, M.C., Janssen, N.A.H., de Hertog, J., Van Vliet, P., Harssema, H. & Brunekreef, B. (1998) Air pollution from traffic in city districts near major motorways, *Atmospheric Environment*, 32(11), pp. 1921–1930.
- Rowe, P. (1987) *Design Thinking* (Cambridge, MA, MIT Press).
- Rubin, A. (2008) *Practitioner's Guide to Using Research for Evidence-Based Practice* (Hoboken, NJ, Wiley).
- Rydin, Y. (2007) Reexamining the role of knowledge within planning theory, *Planning Theory*, 6(1), pp. 52–68.
- Sackett, D.L., Rosenberg, W.M.C., Gray, J.A.M., Haynes, R.B. & Richardson, W.S. (1996) Evidence based medicine: what it is and what it isn't: it's about integrating individual clinical expertise and the best external evidence, *British Medical Journal*, 312, pp. 71–72.
- Sager, T. & Ravlum, I.A. (2005) The political relevance of planners' analysis: the case of a parliamentary standing committee, *Planning Theory*, 4(1), pp. 33–65.
- Sandercock, L. & Forsyth, A. (1992) Feminist theory and planning theory: the epistemological links, *Planning Theory*, 7–8, pp. 45–49.
- Schön, D.A. (1983) *The Reflective Practitioner* (New York, Basic Books).

- Shulock, N. (1999) The paradox of policy analysis: if it is not used, why do we produce so much of it?, *Journal of Policy Analysis & Management*, 18(2), pp. 226–244.
- Slavin, R.E. (2002) Evidence-based education policies: transforming educational practice and research, *Educational Researcher*, 31(7), pp. 15–21.
- Snyder, J. (1984) Introduction to architectural research, in: J. Snyder (Ed.) *Architectural Research* (New York, Van Nostrand Reinhold).
- Solesbury, W. (2001) *Evidence-Based Policy: Whence it Came and Where it's Going, Working Paper 1* (London, ESRC UK Centre for Evidence Based Policy and Practice).
- Steedman, R.J. (1988) Modifications and assessment on an index of biotic integrity to quantify stream quality in Southern Ontario, *Canadian Journal of Fisheries & Aquatic Sciences*, 45(3), pp. 492–501.
- SPMT (Strategic Policy Making Team) (1999) *Professional Policy Making for the Twenty First Century* (London, Cabinet Office). Available at <http://www.cabinet-office.gov.uk/moderngov/policy/index.htm>.
- Throgmorton, J. (1996) *Planning as Persuasive Storytelling* (Chicago, IL, University of Chicago Press).
- Tufford, D.L., McKellar, H.N. Jr. & Hussey, J.R. (1998) In-stream nonpoint source nutrient prediction with land-use proximity and seasonality, *Journal of Environmental Quality*, 27(1), pp. 100–111.
- Ulrich, R.S., Simons, R.F., Losito, B.D., Fiorito, E., Miles, M.A. & Zelson, M. (1991) Stress recovery during exposure to natural and urban environments, *Journal of Environmental Psychology*, 11(3), pp. 201–230.
- Umemoto, K. (2001) Walking in another's shoes: epistemological challenges in participatory planning, *Journal of Planning Education & Research*, 21, pp. 17–31.
- Untermann, R.K. (1984) *Accommodating the Pedestrian* (New York, Van Nostrand Reinhold).
- Van Herzele, A. (2004) Local knowledge in action: valuing nonprofessional reasoning in the planning process, *Journal of Planning Education & Research*, 24(2), pp. 197–212.
- Webb, S.A. (2001) Some considerations on the validity of evidence-based practice in social work, *British Journal of Social Work*, 31(1), pp. 57–79.
- Wendel-Vos, W., Droomers, M., Kremers, S., Brug, J. & van Lenthe, F. (2007) Potential environmental determinants of physical activity in adults: a systematic review, *Obesity Review*, 8, pp. 425–440.
- Williamson, T.M. (2004) *Sprawl, justice, and citizenship*. Doctoral dissertation, Harvard University, 2004.
- Wong, C. (2006) *Indicators for Urban and Regional Planning: The Interplay of Policy and Methods* (New York, Routledge).
- Wurman, R.S. (2001) *Information Anxiety 2* (Indianapolis, IN, Que).