

MODULE

3

Information Management

A System We Can Count On

Evidence-Based Planning

The Health Planner's Toolkit

Health System Intelligence Project – 2006

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The Health System Intelligence Project (HSIP)

The Health Planner's Toolkit is produced by the Health System Intelligence Project. HSIP consists of a team of health system experts retained by the Ministry of Health and Long-Term Care's Health Results Team for Information Management (HRT-IM) to provide the Local Health Integration Networks (LHINs) with:

- sophisticated data analysis
- interpretation of results
- orientation of new staff to health system data analysis issues
- training on new techniques and technologies pertaining to health system analysis and planning.

The Health Results Team for Information Management created the Health System Intelligence Project to complement and augment the existing analytical and planning capacity within the Ministry of Health and Long-Term Care. The project team is working in concert with Ministry analysts to ensure that the LHINs are provided with the analytic supports they need for their local health system planning activities.

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Is Evidence Important? – The Planner’s Challenge

It’s a busy day for Patel, a LHIN planner. He faces two major projects. Both require understanding of the possibilities and limits of evidence.

- In the first project, Patel faces a mass of data on cardiac care services and outcomes in his area. Out of this jumble Patel must sift the good evidence from the bad and identify patterns in the evidence that will help him plan future cardiac services.
- In the second project, Patel faces an observation made by a local health agency relating to how “people with severe mental illness do not have access to appropriate services in this area.” However, the agency has not provided evidence for this statement,

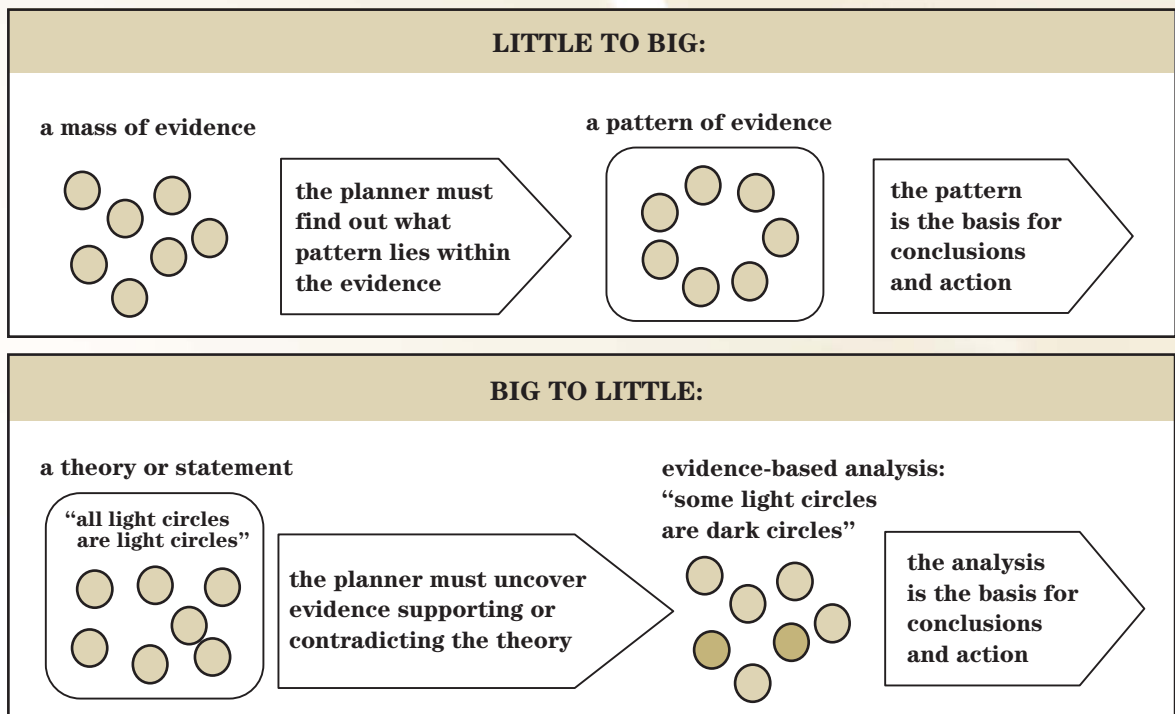
so Patel must find out how true or false the statement is, by finding evidence that supports or contradicts the statement.

Patel faces the two biggest challenges faced by planners:

- the need to look at a mass of evidence to see what patterns exist within it (the little-to-big challenge)
- the need to examine a broad statement or theory and determine whether evidence supports the theory (the big-to-little challenge).

In a nutshell, both challenges rely on evidence as depicted in Figure 1.

Figure 1: Evidence Patterns



This Module's Purpose

This module describes the types of evidence that can be used to support health planning. It considers what is meant by “evidence” and defines “evidence-based health planning.”

This module also provides guidance to identify, select, evaluate, and apply evidence to support planning. The concepts and guidelines will help provide the necessary rationale to support recommendations and decisions.

What is Evidence?

“Evidence” has been described as a property of data that changes our beliefs about how the world around us is working. It is the basis upon which we derive inferences, come to conclusions, and make decisions.¹ There are also more specific definitions that have been applied to describe evidence-based medicine² and evidence-based public health.³

“All the computers in the world won’t help you if your unexamined and unconscious assumptions on the nature of reality are simply wrong in their basic conception.”

– William Irwin Thompson,
At The Edge of History, 1971

Definitions for the clinical and public health evidence base differ mainly in orientation towards either:

- treatment of individuals; or
- understanding of populations.

In health planning, the evidence base is often informed by clinical practice and interventions, but is understood and applied across health care settings and populations.

Evidence-based planning is therefore:

Application of the best available information derived from clinical, epidemiological, administrative, demographic and other relevant sources and consultations to clearly describe current and desired outcomes for an identified population or organization.

1.1 Evidence is Emergent

Evidence is rarely eternal or constant. An excellent example is peptic ulcer disease.

In the 1970’s standard advice called for diet change and stress reduction as the routes to health. In the 1980’s drugs were introduced that were thought to interfere with the cause, and offer relief. It was not until the late 1990’s that the bacterium *Helicobacter pylori* was identified as the causative agent and current treatments were proposed.

In each decade, the evidence at that time was considered sufficiently sound to make medical decisions. But evidence is emergent, and there is always the possibility that even the best evidence can be overturned in the course of time.

1.2 Evidence-Based Planning has Long-Term Impact

It is important that a range of evidence be gathered to create a coherent story that “tells itself” into the future. The size, complexity and dynamic nature of the health care system are such that the effects of planning may not be seen for years or even decades. Great care must be taken in establishing the evidence base for planning decisions as the results may well have long-lasting impacts.

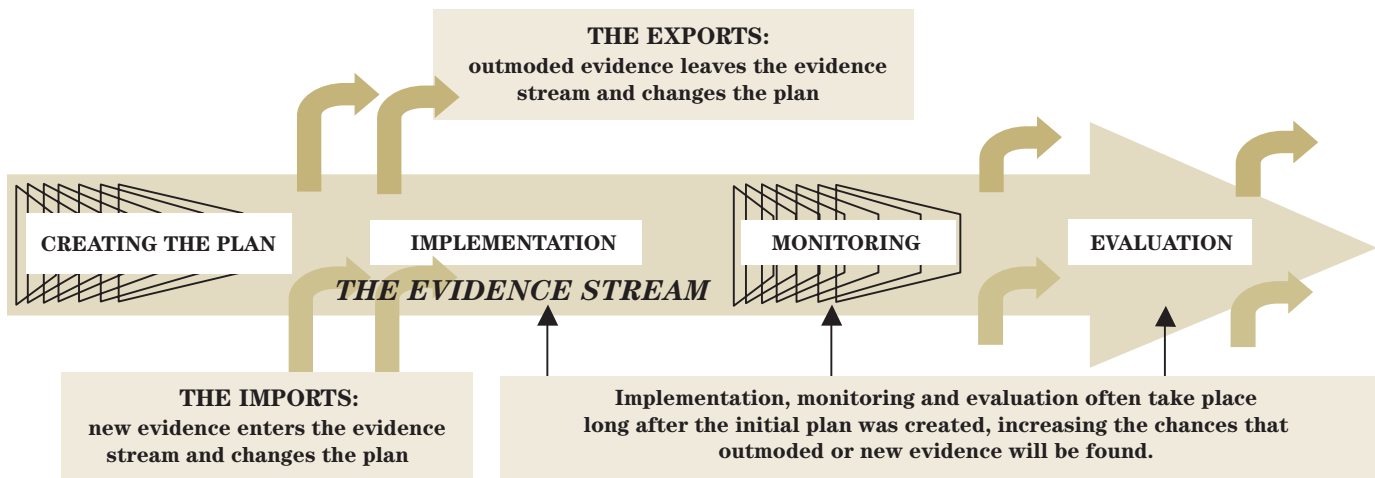
In short, planners who use evidence must be prepared to act as importers and exporters of evidence for plans that have long-term implementation schedules and long-term impacts on health.

There is no single type of evidence useful for planning to the exclusion of other types. Rather, the type of information needed depends on the stage in the overall planning process (see Module 1, *The Planning Process*, for ways to conduct planning).

A simple model illustrates information requirements. Planners are interested in evidence that helps with:

- strategic decision making, or process planning
- program implementation or management
- monitoring outcomes or achievements
- evaluation of what works and what does not.⁴

Figure 2: The Evidence Stream



1.3 Evidence can be Quantitative or Qualitative

The evidence used in planning may be **quantitative** or **qualitative**:

- **Quantitative**, or numeric information, is obtained from various databases and can be expressed using statistics.
- **Qualitative** information is narrative and reflects individual insights or observations. Qualitative information is usually non-numeric and is not analysed using statistical methods.

“We are all humiliated by the sudden discovery of a fact which has existed very comfortably and perhaps been staring at us in private while we have been making up our world entirely without it.”

– George Eliot (Mary Ann Evans),
Middlemarch, 1872

Planning relies on a balance of quantitative and qualitative information. Module 1, *The Planning Process* and Module 5, *Community Engagement and Communication*, provide more comprehensive advice in obtaining and using qualitative evidence.

Quantitative Evidence

Evidence is relatively easy to adopt in the physical sciences where results are consistent even when measured in different ways. For example, one can repeatedly measure acceleration due to gravity, in different places and with different techniques, and always come out close to a constant value. But biological systems are less predictable. Interventions to promote health or treat an ailment do not always produce consistent results. Social structures such as health care systems are even more complex, and effects or outcomes can be hard to isolate.

Two types of quantitative data are used in health planning:

- Information about the population is referred to as **epidemiological data**⁵ (Examples will be discussed later, but basically this includes census, survey, and other population statistics.)
- This differs from **administrative data**, which captures activity within the health care system. This information is useful to describe features of the population receiving care, but sometimes only describes activity of the care system.

As well, **journal articles** and **reports** from various organizations provide summaries and analyses. Though usually based on quantitative data, there are some journals and articles that deal with qualitative studies. These analyses will employ methods that vary in terms of the confidence that can be ascribed to their findings. It is important to understand different methods of inquiry and how they result in a “hierarchy of evidence” (see Appendix A).

Qualitative Evidence

Qualitative evidence is the opinion, wisdom, or **advice** proffered by individuals or groups. Though advice may be biased, when enough people are consulted a comprehensive view usually emerges. Since health planning is complex and cannot rely only on computational modelling and statistics, planners often highly value expert advice in identifying issues, assimilating information and guiding interpretation.

“We do not see things as they are. We see things as we are.”

– Anaïs Nin

A simple table (see Table 1) shows how the five types of information best address the four purposes of evidence, or planning stages. The fit is not perfect, so the strength of the relationships is shown to suggest how much dependency to place on each type of information when addressing a specific purpose for evidence. Table 1 shows the purposes of evidence in relation to the types of information available. The relative usefulness of evidence types for each given purpose is indicated by the number of checkmarks. The pattern reflects general relationships, but may differ for specific planning, implementation, monitoring or evaluation exercises.

Table 1: Four purposes of evidence showing relative value of evidence types

	Planning	Implementation	Monitoring	Evaluation
Epidemiological	✓✓✓	✓✓	✓✓✓	✓✓
Administrative	✓✓✓	✓✓✓	✓✓✓	✓✓
Journal	✓	✓✓	✓	✓✓✓
Report	✓✓	✓✓	✓✓	✓✓✓
Advice	✓✓✓	✓	✓	✓✓

How do I Find the Evidence I Need?

Evidence described in the previous section can be located in several ways:

- Reports and journals are readily accessible through libraries, organizations and the Internet.
- Tables with aggregate data may also be available through websites, but access to detailed (i.e., record level) epidemiological and administrative data holdings is generally restricted.
- Public access files can often be purchased, or obtained under agreements with eligible organizations such as Statistics Canada.
- In Ontario, the Provincial Health Planning Database (PHPDB) provides detailed access to anonymised “record level” files to support planning and management.

Record level or micro-data files contain individual records and provide greater flexibility as information can be organized into custom tables to meet specific purposes.⁶ Access to the PHPDB is tightly restricted. Organizations must be eligible, and users must be trained and licensed to use this micro-data under strict guidelines that govern the use and release of these data.

Analysis at the individual record level, or by small geographic area, provides the ability to describe experiences of specific populations and activity by specific providers.

This is usually an essential feature of the planning process as it addresses two primary questions:

- What services are being received by area residents?
- What services are being delivered by area providers?

Understanding these questions leads to analyses of factors such as access issues, referral patterns and capacity.

Analysis of such micro-data is also important to monitor and evaluate the impact of changes and interventions. Since working with micro-data can be complex, such work must be done by skilled and experienced analysts.

The final type of information, expert advice, is probably the most local since it depends on the knowledge and experience of individuals. Advice on how to engage such individuals is provided in Module 5 (*Community Engagement and Communication*).

Table 2 comprises a matrix to show where information can be located within the Ontario context.

The number of checkmarks in Table 2 indicates preferred locations for the information needed. The following sections will provide brief summaries of information and access strategies for these highlighted areas.

Table 2: Locations of different types of evidence

	PHPDB	Providers/Programs	Websites	Publications	Consultations
Epidemiological	✓✓✓	✓	✓✓	✓✓	
Administrative	✓✓✓	✓✓	✓		
Journal articles (research)			✓✓	✓✓✓	
Report			✓✓✓	✓	✓
Advice		✓✓	✓	✓	✓✓✓

2.1 Epidemiological Data

Much useful summary information can be obtained from websites and publications, but custom tabulations are often necessary. Data are available for detailed custom analyses through the Ministry's Ontario Provincial Health Planning Database (PHPDB), and through agreements with agencies like Statistics Canada.

The most commonly used epidemiological data are:

- The Census of Canada
- Population Estimates and Projections
- Vital Statistics – notably births and deaths
- Statistics Canada Health Surveys – notably, Canadian Community Health Surveys (CCHS).

These data are about people, and describe health-related characteristics of populations.

2.2 Administrative Data

Administrative data describe the activities of the health services system, and are particularly useful for planning when these activities can be related to individuals receiving care. Some administrative data are available on websites (in summary or aggregate form), particularly where used as Health Indicators (see CIHL.ca). It is likely, however, that it will be necessary to analyse micro-data to focus on specific interventions, patients, and areas of interest. Some commonly used administrative datasets are:

- Discharge Abstract Database (DAD)
- National Ambulatory Care Reporting System (NACRS)
- Physician Claims/Medical Services Databases
- Ontario Healthcare Reporting System (OHRS).

*The Health Analyst's Toolkit*⁷ has detailed information on some of the databases most commonly used for planning. A more comprehensive list of data holdings is contained in the *Ontario Health Planning Data Guide*⁸, while the *Ontario Health Planning Survey Guide*⁹ provides descriptions of current and historical health-related surveys.

Disease related registries describe specific populations. They are usually built by combining information from different administrative source files and may include unique elements and derived variables. In Ontario for example, registries are maintained for residents with diagnoses of cancer, diabetes, and stroke. There are also national registries, and many local registries created to support clinical practices.

2.3 Journals

Journal articles as a source of evidence have several strengths:

- Findings have generally been peer reviewed.
- Methods are usually well documented.
- They often contain considerable information on best practices in care, evaluations of community-based interventions and research on indicators and performance measurement.

But journal articles have limitations:

- There are likely to be few articles that are obviously relevant to a specific planning process.
- Most articles narrowly focus on clearly defined components or issues.
- Individual research studies vary in quality and sometimes produce discrepant findings.

Systematic reviews are important because they identify, appraise and synthesise research evidence from individual studies. Systematic reviews differ from other reviews because they follow strict protocols to ensure that the relevant research base has been fully considered and that the original studies are validly appraised and synthesised. Systematic reviews also include unpublished research not found in other reviews. These methods minimise the risk of bias, thus enabling replication.¹⁰

Some journals publish content on the Internet. Most require a subscription for full text. Appendices B, C and D provide tools to assist with Internet searches, including addresses for several search sites. Using identified search sites helps ensure access to reputable

journals and may provide access to information that is not freely accessible through a general Internet search engine.

2.4 Reports (Grey Literature)

Web-based publishing is now the medium of choice for government and research organizations. Many web-based reports provide valuable information for planning. Some offer relevant Canadian, Ontario and local evidence. Others describe experiences from other countries and are a great source of ideas and comparators.

These reports are called “grey literature” because they are not usually listed in libraries or indexes. Many organizations publish reports completely in-house for relatively small and specialised audiences.

Useful sites include:

- www.CIHI.ca
(Canadian Institute for Health Information)
- www.statcan.ca (Statistics Canada)
- www.ICES.on.ca
(Institute for Clinical Evaluative Sciences)
- www.who.int/en/ (World Health Organization)
- www.nice.org.uk
(National Institute for Clinical Excellence)
- www.dhcarchives.com
(Ontario District Health Council archives)

2.5 Expert Advice

Experts often provide critical information that is not otherwise obtainable. Consultations will often reveal important social and political contexts that need to be understood and incorporated. Experts can also shed light on the quality of information, comment on its application and interpretation, and lend credibility to a local or community process.

“There are some people that if they don’t know,
you can’t tell ‘em.”

– Louis Armstrong

Identifying experts who represent different constituencies and interests is vital. A great benefit of expert engagement is exposure to different perspectives and different interpretations of the same information. It is not always possible, nor essential that expert advisors all agree: there is great value in early understanding of weaknesses and points of contention, because it is easier to present and promote the evidence if the planner already knows where assumptions and evidence are tenuous.

Engagement with experts should occur at two points:

- when planning the assembly of evidence
- when interpreting the findings.

Sometimes it may be possible to uncover expert opinion through a steering or advisory group that meets several times and that engages experts by putting a clear set of issues before them.

How do I Judge the Quality of Information?

There are clear guidelines for judging the quality of “scientific” evidence – the kind that finds its way into journal articles. Appendix A shows how scientific evidence can be ranked according to the reliability of the methods used.¹¹

Numeric evidence used in planning comes from a variety of sources and may often be custom tabulated from analysis of micro-data. These tabulations may be done in-house, by a support organization or consultant, or through a special request to a source such as Statistics Canada or a local provider. This information is likely to have great value, but could be considered less reliable than information from journals or published reports. It is important to ask what quality checks are in place to verify custom tabulations and to ensure that analyses are performed by credible organizations or skilled analysts using credible, standardized and established methodologies.^{12,13}

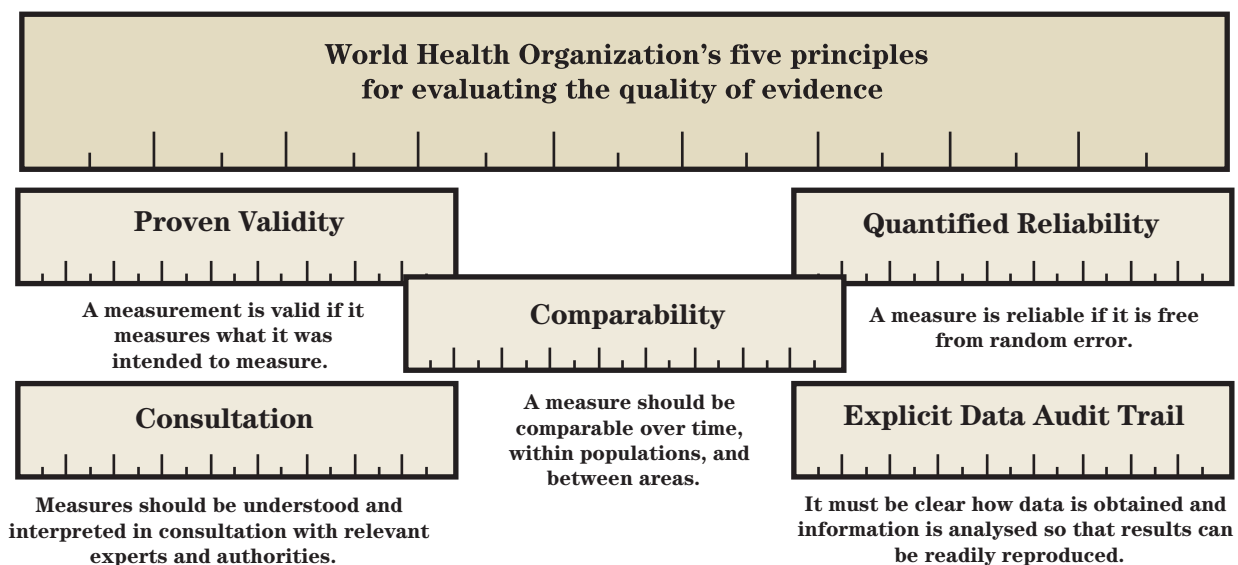
When requesting custom information, be sure to:

- Think through what the planning questions are and how they can be answered by evidence. Too often, requests for information are not carefully considered and the results raise more questions than they answer.
- Seek the advice of skilled personnel in the organization from which the information is being sought. They can often help reframe questions, suggest better ways to provide the needed information, raise awareness of the strengths and limitations of the information they provide, and help the information user to understand the range of interpretations of results.

A significant amount of effort is needed to properly clarify a request, and ensure the tabulations address the right questions. The payoff from this effort is good answers to good questions.

The World Health Organization (WHO) has formulated five principles for evaluating the quality of evidence, adapted below to address local planning needs.¹⁴

Figure 3: WHO Principles for Evaluating Evidence



3.1 Proven Validity

“A measurement is valid if it measures what it was intended to measure.”

It is always important to consider basic assumptions with any evidence. The most basic assumption is validity. This is an important concept, since things are not usually measured directly. This is particularly true of things like “health” and “performance” where indicators are used to represent the issue of interest. Even more direct measures such as the number of services delivered may not be complete and accurate. One of the most common ways to discredit a plan is to claim the information used was not valid.

If interested in hospitalization rates for Ontarians with diabetes, a well-designed survey is likely to provide more valid results than analysis of hospitalizations with diabetes listed as the diagnosis. This latter approach produces less valid information because diabetes is often not the main reason that diabetic patients are hospitalized, though it may well be the underlying cause.

3.2 Quantified Reliability

“A measure is reliable if it is free from random error.”

In measurement the word “error” means the accuracy of the measurement instrument. If a planner knows that he always undercounts by 10%, then the error is systematic and the planner can adjust the results accordingly. But what if the measurement is sometimes too low, and sometimes too high? When the error is unpredictable it is considered random and the measurement instrument, and thereby the measure, is not reliable. This error is common in administrative data that may be entered differently in different organizations, making accurate comparison impossible. For instance, coding of diagnostic information is considered fairly reliable for hospitals that use expert coders who follow explicit guidelines. On the other hand, using physician billing information to identify patient diagnoses is unreliable since its coding is variable and random across the province.

In short, always consider how information is captured and how reliable the measure really is.

3.3 Comparability

“A measure should be comparable over time, within populations, and between areas.”

Planning relies on measures that yield reliable comparisons. The current situation must be understood in context through comparison with other areas and by reviewing trends over time. Once implemented, a plan’s impact must be measurable. This can only happen if the measures are comparable, such that differences are attributable to the planned intervention. Some measures may not work as well with different populations, areas, or over time. For example, changes in diagnostic coding rules in the last few years mean that some disease categories such as respiratory disease are not comparable between ICD-9 and ICD-10 WHO disease classification systems.¹⁵

3.4 Consultation

“Measures should be understood and interpreted in consultation with relevant experts and authorities.”

The importance of experts in supporting the evidence base has been noted. In health planning, experts are also critical in helping to:

- formulate the right questions
- identify sources of information
- contribute their own knowledge and experiences.

The consultation principle emphasises the importance of experts in interpreting and understanding the evidence. Often it is not until experts are consulted that validity, reliability, and comparability issues surface.

3.5 Explicit Data Audit Trail

“It must be clear how data is obtained and information is analysed so that results can be readily reproduced.”

Keeping good records and documenting all methods is essential. Information must be replicable, and analyses must be easily repeated to show reliability and to measure impacts. If there is not a good audit trail, results are easily dismissed or misinterpreted.

The WHO principles are useful but are not always easy to apply. How does a planner know if the measure is valid, or if it is reliable or comparable? These concepts depend on the information being “true.” There is, however, a scientific viewpoint that can be applied to evaluating the quality of the evidence (see Appendix D for an illustration of these guidelines).¹⁶ Lomas et al contrast this with a “colloquial” view of evidence.¹⁷ They argue that non-researchers consider evidence to be “anything that establishes a fact or gives reason for believing in something.” In contrast, researchers demand that specific processes and procedures be followed to establish evidence in ways that are considered scientific. However, it is the colloquial view that drives much policy, and policy is central to health system guidance. Rather than dismiss the colloquial view, Lomas et al suggest that a deliberative process built on expert consultation can create an evidence-driven and balanced consensus.

Section 4

How do I Use Information with Confidence?

Most planners dream of a day when they will produce a perfect plan – a vehicle for absolute truths, a plan in which the evidence is comprehensive, completely accurate, utterly precise, and aligned in exactly the same direction – a plan in which the conclusions are as certain as the evidence.

But in all probability, no such plan will ever exist. The information used to shape planning may be like the gestalt movement in art, which used independent and discontinuous visual information to yield compelling and coherent images. Planning usually involves:

- Making the very best picture out of the discontinuous information that has been gathered. The most reliable view will be one that is built on many foundations that together suggest a coherent whole.
- Using the evidence to produce the best plan possible under imperfect conditions.

Nevertheless there are three measures of success in achieving good planning despite imperfections in the evidence:

The Validity Measure:

Are the conclusions justified by the methods used? Were the methods sound and properly applied? Does the information gathered address the planning questions posed?

“In my youth I regarded the universe as an open book, printed in the language of physical equations and social determinants, whereas now it appears to me as a text written in invisible ink, of which, in our rare moments of grace, we are able to decipher a small fragment.”

– Arthur Koestler,
The Invisible Writing, 1954

The Coherence Measure:

If the findings differ, do they do so in ways that can be understood and explained?

The Applicability Measure:

Does the accumulated evidence fit with the problem at hand? Do the results help locally? Do the results provide information that will inform planners and decision-makers? Do results identify how change can be measured? Do results capture relevant unique local realities?

There is no perfect evidence base,¹⁸ but it is vital that information be used to shape decisions. A plan’s evidence may never be perfect, but using and sharing evidence through a well crafted plan can make evidence better for the sake of future planning cycles.^{19,20}

The connection between the quality of evidence and the quality of planning stemming from this evidence can be shown graphically.

While validity, coherence and applicability provide a useful general framework, other specific areas warrant consideration when applying epidemiological and administrative data to local planning. These areas are outlined below.

4.1 Population Coverage

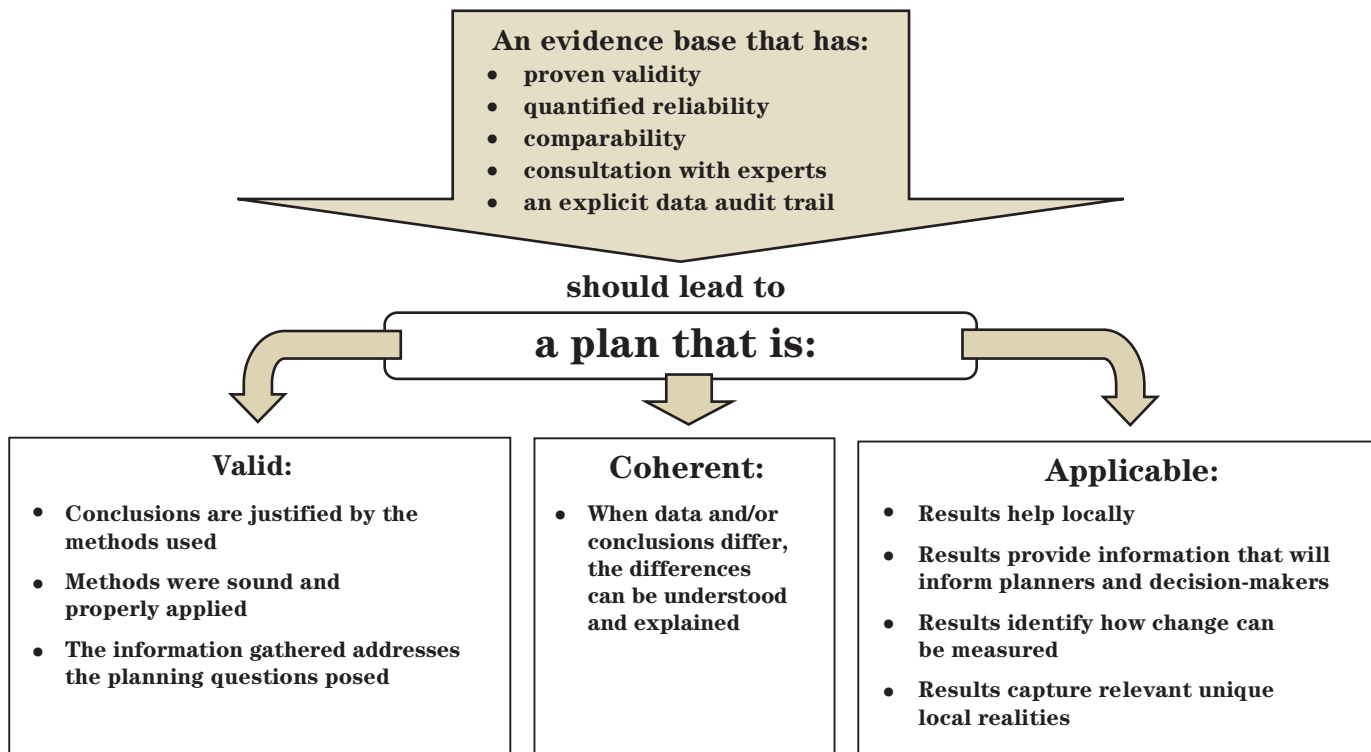
It is always important to consider how complete the evidence is. Much of planning involves estimates of factors such as sizing, resource distribution and activity ratios. These depend on knowing real quantities. However, many databases do not provide 100% coverage, and the coverage rate may be particularly poor in specific areas. For example, coverage of population characteristics is poor for First Nations Reserves, and the Ontario Breast Screening Program provides uneven coverage across the province. If coverage is an area of concern, complementary data sources must be sought.

4.2 Sampling

Sampling involves selecting a group of individuals to represent the characteristics of a larger population. Sampling selections should be made in an objective unbiased way. Web-based surveys, for example, will not be representative of the general population because the sample is self-selected and therefore likely to be highly biased.

A common way to obtain a simple random sample is through random digit dialing for telephone surveys. Sometimes households are sampled to receive mail surveys, but these surveys have lower response rates than telephone surveys. But both telephone and mailed surveys have limitations. The sample responding may be different than the sample selected, and this difference is likely greater with the lower response rates found in mailed surveys. Sampling, therefore, depends on both unbiased or random selection and a good or representative response rate.

Figure 4: Connecting Evidence and Planning



4.3 Geography

Sometimes it is necessary to assume that information from one jurisdiction applies to people in a different jurisdiction. For example, local plans may use a national diabetes rate to estimate the number of diabetics in the community of interest. But is this a reasonable estimate of what the burden might be within a local area?

If the national rate seems valid and reliable, and if the population characteristics of the community of interest are similar to the national population, then the estimate can be used. However, there may well be differences that should be taken into consideration. Age differences can and should, for instance, be accommodated when possible. If the local area's population is proportionately younger, then the national estimate will be too high. And other relevant factors should be considered. For example, if the local population has a higher rate of obesity, then the rate of diabetes in the population will likely be higher locally than nationally. It is, of course, ideal if the information available reflects the geography of interest.

If there is information on a specific community it is either going to be epidemiological, such as health survey data, or administrative, as captured in provider records. In either case it is important to determine if the sample or count is sufficiently large enough to provide a stable estimate. Guidelines for survey analysis will depend on the nature of the question and the survey methodology. Statistics Canada guidelines for most health surveys suggest about 30 respondents are needed in any cell. Practically, that can mean a survey sample of several hundred for a simple analysis. For administrative data, which represents all users of a service, infrequent events will likely be highly variable over time and more difficult to plan for.

It is important to determine whether evidence is based on the location of the population, or on the location of the provider:

- The former supports analysis of population health, access to services, and equity.
- The latter is used to describe outputs and perfor-

mance, and may be used to describe market share.

Balanced use of resident-based and provider-based information is required to provide answers about how services are accessed within a community. But since they answer different types of questions, they should be treated separately. Provider-based information can identify an institution's referral area but this will not provide evidence about access to services by specific communities. For this, resident-based information must be used.

4.4 Time Trends

Most people want to see data for several points in time, but how many points are needed to conclude that there is a trend? In the quality improvement literature seven is the recommended minimum to detect a trend.²² With health information, however, there may not be enough points to clearly establish a seven-point trend, and decisions may have to be made based on three to five points in time. Sometimes a planner can increase the points by, for example, using quarterly rather than annual data, but seasonal variation can make this solution tenuous.

Caution must be used when discussing trends and it is important to refrain from confident statements about trends unless there is good corroborating evidence such as similar patterns in comparable jurisdictions.

4.5 Standardization

Standardization is needed to ensure that information from different areas or different time periods can be fairly compared. There are different ways to standardize data but the objective is always to ensure that comparisons are free from bias. The most common bias removed in health information is age bias since this is heavily related to a population's overall health status and use of health services. Guidelines on standardization are provided in the *Health Analyst's Toolkit*. Here it is sufficient to note that comparisons between areas or over long periods of time must be standardized to be comparable.

4.6 Interpreting Statistical Differences

The concept of “statistical” difference is rooted in experimental methods and was originally considered a reflection of the accuracy of measurement.²³

When a thermometer is used to measure body temperature, the reading can be used to indicate health or ill health. But two things must be assumed for such conclusion:

- The thermometer must be working properly.
- The site of measurement must fairly represent the issue of interest.

Over time, and with experience, people learn the right places to place the thermometer to get useful readings. It is the first issue that bears more careful scrutiny, because it is variability in accuracy of measurement that lies at the heart of the scientific method.

Tests of significance assume a specific distribution of error in the measurement device. In most cases, and unless specifically noted, this error is assumed to be normally distributed. The thermometer is therefore expected to measure the same phenomenon slightly differently for different readings – sometimes too high, sometimes too low. The range of error for this thermometer is small, so when the body’s temperature goes up a couple of degrees it is perceived as a real difference.

In health care there are some areas of interest that yield stable and reliable information. Administrative data often capture huge volumes of information, much of it fairly reliable and consistent. Inpatient hospital days, for example, can be accurately reported. The 2003/04 Ontario hospital total inpatient acute days is 6,422,893. A proportionately small change in this number would be greater than the expected variability in this measure. With large amounts of information a relatively small change can be considered significant.

There are also many rare events and sampled data that provide a less stable picture. Sometimes these events are very important – for instance, deaths from a newly mutated virus. But these events are usually not part of a system planning process, though they must be monitored through surveillance. The variability in measurement of rare events means that it will take a proportionately big effect to proclaim significance.

The ability to measure phenomena in health care is often less reliable than a thermometer, but since most events of interest in planning are common and applicable to large populations there is less concern about variability than about confounding (described in the next section).

4.7 Confounding

When more than one thing influences the measure of interest, there is potential for confounding. This can make it impossible to draw appropriate conclusions. Last identifies confounding as “*a relationship between the effects of two or more causal factors as observed in a set of data such that it is not logically possible to separate the contributions that any single causal factor has made to the effect.*”³ Confounding is pervasive in complex systems as multiple factors can influence the outcomes of interest. Fortunately there are techniques that help reduce and accommodate confounding variables, and information can be better interpreted if potential confounders are considered.

For instance, a planner may observe an increase in admissions to long term care homes and may conclude that more people are getting access to needed services. But if the population of eligible residents is rising at a faster rate, then access has actually declined. This simple case of confounding is easily addressed by using population or standardized ratios that will account for growth.

However there may be other important considerations. Are elderly becoming healthier? Are there alternatives available that may be preferred? Are there changes in admission procedures or referral patterns? These factors - and many others - can influence the observed rate. Some may exert a strong influence and must be accommodated. Others may be less important.

Identifying possible confounders and considering their possible impact on the evidence is extremely important. Experiments and good studies go to great lengths to control for confounding. In evidence-based planning these methods cannot be used and planners must often rely on information that is influenced by many different factors. A planning report's conclusions and recommendations should give due consideration to alternative plausible explanations and should not ignore confounding influences and associated competing explanations.

4.8 Confounding the Past and the Future

It is easy to become immersed in historical information and to believe that the future will resemble the past. But the information used for planning is outdated (often several years old) and is a reflection of where a population of interest has been, while planning is about where the population is going and where it wants to go.

While the best evidence from the past may have been accumulated, the goal is to determine what this reveals about the future. No planning exercise can really work without some projection modelling. This is usually done by applying population projections to historical information. But it is worth considering that projections of hospital bed requirements before the invention of laparoscopic surgery would have been wildly inaccurate from the current perspective.

So how can yesterday's evidence be used to plan tomorrow's world? One approach is to develop scenarios or conduct sensitivity analyses to put high and low bounds on plans. This lack of precision, however, can be unsatisfactory. Another approach is to limit the time horizon since new technologies will take

“Telling the future by looking at the past assumes that conditions remain constant. This is like driving a car by looking in the rear-view mirror.”

– Herb Brody

five to ten years to have a major impact. Regardless, it is important to consider what may change and how the change will impact assumptions based on projecting information from the past into the future.

There are different purposes for which information is applied towards future scenarios. These are described in the World Health Organization's Health Futures²⁴ as:

1. **Prediction:** describing what one aspect of the future is likely to be
2. **Forecasting:** describing several feasible or plausible futures of fairly high degrees of probability
3. **Foresight:** looking at a wider range of possible futures, among which may be probable and improbable ones, desirable and undesirable ones, and ones reflecting major trends or events
4. **Envisioning:** imagining one or more desirable futures
5. **Testing options:** determining futures likely to result from alternate policy choices and other options.

The choice and use of information will vary with the option of interest. Forecasting, for example, will require more than one future scenario, while prediction is based on identifying the most likely or anticipated outcome.

How are Things Measured?

5.1 Indicators

Indicators are measures constructed to be comparable over time and across jurisdictions. They measure important phenomena that have broader interpretation than the specific measure. For example, infant mortality rates are indicators of the overall performance of a country's health care system.

There are different types of indicators used in the health domain:

- **Health indicators** are measures that reflect, or indicate, the state of health of persons in a defined population.
- **Health system or health care indicators** reflect activities that promote health or respond to disease such as disease screening rates or average lengths of stay.
- **Performance and quality indicators** are health system indicators that are designed to track specific dimensions of the health services system.
- **Structural indicators** provide descriptive information such as the number of beds in a facility.
- **Process indicators** are commonly used to improve management and quality. Wait times may be considered a process indicator.
- **Output indicators** are among the most often cited measures. These are the amounts of activity recorded, such as surgeries performed or meals delivered.
- **Outcome indicators** may be difficult to relate directly to the actions of the health care system but are nonetheless measures of the system's goals. Mortality rates and measures of population health are outcome indicators.

To be comparable, indicators have denominators to produce proportions or rates, and are often adjusted or standardized to compensate for age structure. In cases where performance between two care organizations is being compared, indicators may be risk-adjusted to compensate for differences in patient acuity or illness.

Indicators are used for comparisons, and therefore most are expressed as rates, proportions, or percentages:

- For rates, the number is often divided by the population.
- Proportions are created by dividing the number of interest by the total count (e.g., cancer deaths divided by all deaths).
- Percentages are proportions multiplied by 100.

There are more complex methods for creating indicators but they usually involve conversion of the raw counts to yield comparable numbers.

Indicators can be categorized as structure, process, output and outcome measures, based on a logic model framework. Logic models describe components of a system in simple terms, to show dependencies. Figure 5 provides a simple logic model.

Often indicators that are earlier in this process are called "lead" indicators, with related subsequent measures being called "lag" indicators. For example, smoking rates are a lead indicator, causally related to lung cancer treatment and mortality, which would be lag indicators.

Figure 5: Logic Model for Categorizing Health Indicators



(outcomes depend on outputs, which depend on process, which depends on structure)

5.2 Benchmarks and Targets

Benchmarks and targets are important tools to evaluate performance in health. They are slightly different conceptually:

- A **benchmark** is a “point of reference for measurement”²⁵ and a “standard by which something can be measured or judged”²⁶, Benchmarking is “a process of measuring another organization’s product or service according to specified standards in order to compare it with and improve one’s own product or service”²⁷. Benchmarks usually are attainable values that have been achieved within the area of application. In some instances the average measures for the top performing providers could be adopted as a benchmark. For example, wait times for a specific procedure may be calculated and used to develop a benchmark that separates the best 20% from the rest. This benchmark then can become a “target” value.
- A **target** specifies a desired level of performance and often involves some increment of improvement over an existing performance level. Targets, when

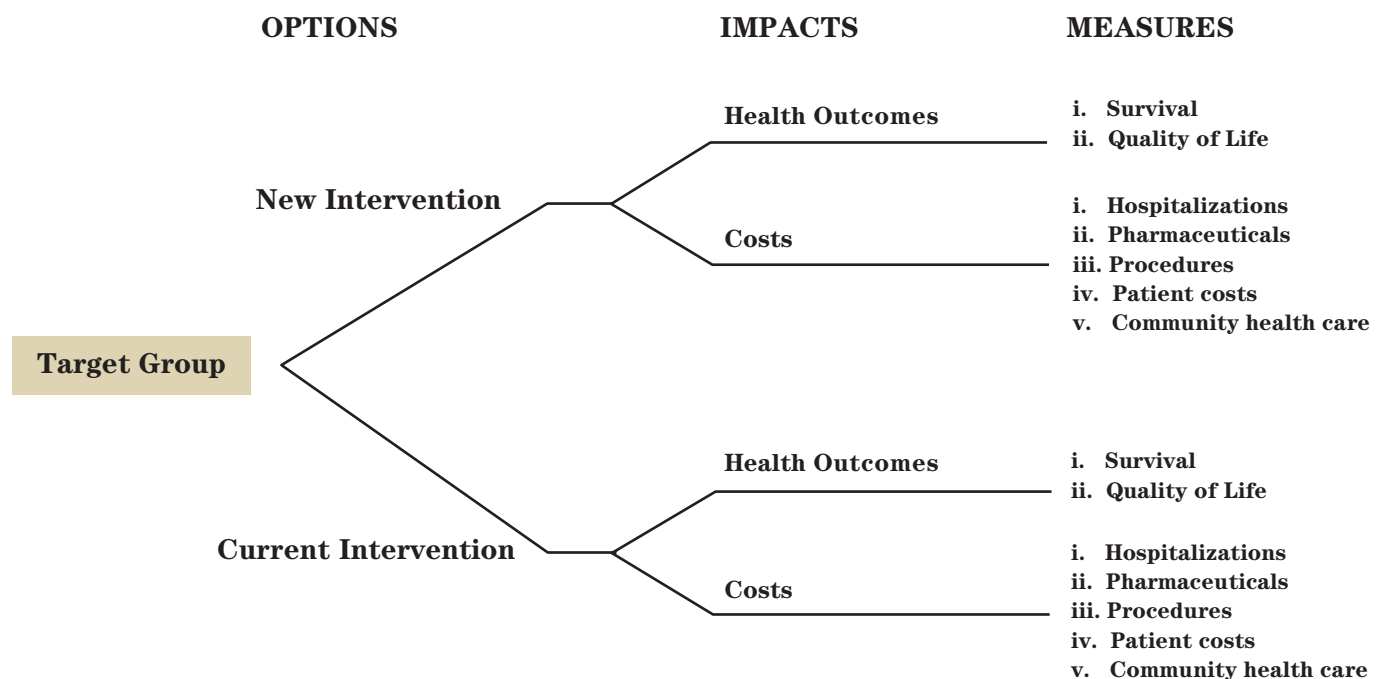
attained, usually reflect improved performance.

Targets are sometimes set beyond existing values, and performance is measured by reducing the distance to the target, not necessarily by reaching the target. For example, eliminating tobacco use may be a public health target, but not one that is likely to be achieved.

5.3 Economic Evaluation

It can be difficult to make choices about the benefits of health care programs because the outcomes may be hard to define. But assessing benefits is important because lives may be prolonged or improved as a result of resource allocation decisions. An allocation decision is not hard if there are ample resources, but when resources are limited, choices must be made between programs and interventions by comparing them to each other in terms of both costs and outcomes. Health economics provides tools that make such comparisons possible (see Module 2, *Assessing Need* and Module 6, *Establishing Priorities*).

Figure 6: Nature of an Economic Evaluation



There are, however, some hefty assumptions that need to be made and accepted. Nevertheless, these techniques are valuable tools for making tough allocation decisions.

Economic evaluations are best used to compare the costs and benefits of discrete and clear alternatives. They are suitable for analysis of new drugs and technologies. Actually applying the models, however, can be difficult because there are often many other variables to consider that may confound results. The costing itself is particularly challenging in the Canadian health services environment which, unlike the American system, tracks few actual costs (thereby requiring considerable estimation). Regardless, this type of analysis will be increasingly important as new interventions increase the pressure on capacity, thereby requiring tools for effective resource allocation.

- **Cost minimization analysis** deals only with costs, and is the simplest form of analysis.

- **Cost-effectiveness analysis** requires a common measure of the consequences of the program under study, and costs can then be compared in production of a common outcome.
- **Cost-utility analysis** requires “utility” weights that allow comparison of different outcomes. This approach can take into account relative benefits of various interventions, but the determination of weights can be problematic.
- **Cost benefit analysis** converts all benefits into financial measures to place a value on the consequences of a program that can be directly compared to the cost of delivery. In practice, it is difficult to measure the range of potential benefits of a program in monetary terms.²⁸

These techniques are increasingly used in identifying the value of new drugs or technologies. Economic evaluation will likely become a crucial tool in health system planning and management.

Table 3: Types of Economic Evaluation

Form of Analysis	Measurement of Costs	Measurement of Benefit	Synthesis of Costs and Benefits
1. Cost Minimization Analysis ^a	Dollars	None	Incremental cost
2. Cost Effectiveness Analysis	Dollars	Single dimension of effectiveness (e.g., life years gained)	Incremental cost effectiveness: incremental cost per unit gained
3. Cost Utility Analysis	Dollars	Utility gained (e.g., QALYs – quality adjusted life years)	Incremental cost-effectiveness: incremental cost per QALY gained
4. Cost Benefit Analysis	Dollars	Monetary value of benefits gained	Net benefit gained

^a Cost minimization analysis deals only with costs, and is the simplest form of analysis.

Ethics

An ethical approach to planning and to the use and presentation of data is essential. There is no health planner's code of conduct, but there are rules about the use of administrative data and the collection of original data.

There is, of course, never a good reason to disclose personal information in a planning process, but sometimes this can happen inadvertently. To avoid this, small numbers should be suppressed, with the most common threshold being numbers less than five. This protects against "residual disclosure," whereby someone could determine identity based on information that is not directly identifying.

Planning that involves the use of data may require approval from a research ethics review board within an organization providing or generating the data (often requiring submission of a proposal seeking access to, or permission to generate, the data). This is almost certain with new data capture, construction of new linked "cohort" datasets, or research sponsored by a granting agency.

"Always do right. This will gratify some people and astonish the rest."

– Mark Twain

6.1 Tri-Council Statement on Ethical Conduct

In 1994 the three major public research funding bodies in Canada – the Social Sciences and Humanities Research Council (SSHRC), the Medical Research Council (MRC), and the Natural Sciences and Engineering Research Council (NSERC) – began a consultation process to develop a common ethics policy statement. In 1998 this process culminated in the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans*. The three councils adopted this policy as their common standard for ethical conduct, and they required that as a condition of funding, researchers and their institutions apply the ethical principles of this policy. All universities in Canada have agreed to abide by the Tri-Council ethics principles. Work requiring approval by an Ethics Review Board will likely follow this standard. The policy statement is found at http://www.ncehr-cnerh.org/english/code_2/intro01.html.

Summary

This module has provided advice on how to find the evidence needed to support a health planning process. There is actually a lot of data and many information sources that can be accessed, as well as a number of evidence-based clinical and public health websites that deal with many of the issues covered here (See Appendix E). The array of resources available to build an evidence base is vast and becoming more and more accessible through web postings and the development of sophisticated data models and warehouses. But this increased access does not simplify the evidence-based planning challenge.

Framing questions is clearly the key to finding the right evidence. Understanding that the system being studied is complex and probably never going to be reducible to a simple set of “truths” is a prerequisite to a sound knowledge acquisition strategy. Finally, using a range of information types and sources to create a comprehensive overview and converging storyline will result in a solid evidence base to support decisions and plans for the future.

Appendix F provides a simple guide to help structure an inquiry.

“She met vague small talk with ruthless statement of ascertainable fact, and well-worn maxims with a tart demand for evidence.”

– C.S. Lewis,
describing his Ulster grandmother

References

1. Spasoff R. Epidemiological methods for health policy. New York (NY): Oxford University Press; 1999.
2. Sackett D, Richardson W, Rosenberg W, Haynes, R. Evidence-based medicine – how to practice and teach EBM, 2nd Ed. London: Churchill-Livingston, 2000
3. Last R. A dictionary of epidemiology. 4th Ed. New York (NY): Oxford University Press; 2001.
4. Murray C, Mathers C, Salomon, J. Towards evidence based public health. In: Murray C, Evans D (Eds) Health System Performance Assessment, Debates, Methods & Empiricism. WHO: Geneva; 2003. p 715 – 26
5. Huston P, Naylor CD. Health services research: reporting on studies using secondary data sources. Can Med Assoc Journal, 1966, Dec 155 (12): 1697 – 709
6. Black C, McGrail K, Fooks C, Baranek P, Maslove L. Data data everywhere. Centre for Health Services and Policy Research. Vancouver; 2005
7. Ardal S, Baigent L, Bains N, Hay, C, Lee P, Loomer, S. Health analysts toolkit. Health System Intelligence Project, Ontario Ministry of Health and Long-Term Care; 2005.
8. Ontario Ministry of Health and Long-Term Care. Ontario health planning data guide. 2005.
9. Ontario Ministry of Health and Long-Term Care. Ontario health planning survey guide. 2005.
10. Centre for Reviews and Dissemination, University of York, York, UK. Jan. 5, 2006. Available from: <http://www.york.ac.uk/inst/crd/faq1.htm>
11. School of Health and Related Research, University of Sheffield, Sheffield, UK. July 26, 2005. Available from: <http://www.shef.ac.uk/scharr/ir/units/systrev/hierarchy.htm>
12. Kelly M, Swann C, Killoran A, Naidoo B, Barnett-Paige E., Morgan, A. Methodological problems in constructing the evidence base for public health. Health Development Agency, UK; 2002.
13. Rychetnik L, Frommer M. A schema for evaluating evidence on public health interventions; Version 4. National Public Health Partnership, Melbourne; 2002.
14. Murray C, Evans D (Eds) Health System Performance Assessment, Debates, Methods & Empiricism. WHO: Geneva; 2003.
15. Anderson R, Minino A, Hoyert D, Rosenberg H. Comparability of cause of death between ICD-9 and ICD-10: Preliminary estimates. CDC National Vital Statistics Reports: 49-2; 2001.
16. Bains N. Guide to evidence-based research. Health Information Partnership, Eastern Ontario; 2004.
17. Lomas J, Culyer T, McCutcheon C, McAuley L, Law S. Conceptualizing and combining evidence for health system guidance. Canadian Health Services Research Foundation; 2005.
18. Ioannidis, J. Why half of published studies are wrong. PLoS Med, 2005, 2(8): e124
19. Bowen, S. & Zwi, A. Pathways to “Evidence-Informed” Policy & Practice: A framework for action. PLoS Med, 2005, 2(7): e166.
20. Chambers L, Ehrlich A, Picard L, Edwards P. The art and science of evidence-based decision making. Canadian Journal of Public Health 2002; 93 (1) (Special Insert): I1 – I8.
21. Colak E, Nie J, Upshur R. Evidence: Meaning measurement and eikos. CD ROM, Beta Version; 2001.
22. Balestracci D & Barlow J. Quality Improvement: Practical Applications for Medical Group Practice, 2nd Edition. Englewood, CO. Center for Research in Ambulatory Health Care Administration (CRAHCA), 1996.

23. Fisher R. The Design of Experiments. Edinburgh: Oliver and Boyd; 1949.
24. Garrett M. Health futures: A handbook for health professionals. World Health Organization, Geneva; 1999.
25. Webster's New Complete Dictionary. Merriam-Webster. New York (NY): Smithmark; 1995.
26. Wordwebonline. August 27, 2005. Available from: URL <http://www.wordwebonline.com/>
27. European Observatory on Health Systems and Policies. October 11, 2005. Available from: <http://www.euro.who.int/observatory/Glossary/TopPage?phrase=B>
28. Drummon M, O'Brien B, Stoddart G, Torrance G. Methods for the economic evaluation of health care programs. 2nd edition. New York (NY): Oxford University Press; 1999.

Guidelines for Scientific Evidence

The following ranking of methods for collecting evidence is well accepted. This list comes from the University of Sheffield School of Health and Related Research. They note that the higher a methodology is ranked, the more robust and closer to objective truth it is assumed to be.

1. Systematic reviews and meta-analyses

These are “overviews” that either review studies to assess their quality, or use statistical analysis to integrate and synthesise the results of several studies.

2. Randomised controlled trials

Individuals are randomly allocated to a control group and a group who receive a specific intervention. New interventions are usually evaluated using this design.

3. Cohort studies

Groups of people are selected on the basis of a specific exposure and follow up is conducted to study specific outcomes.

4. Case-control studies

“Cases” with the condition are matched with “controls” without the condition, and a retrospective analysis is used to look for differences between the two groups.

5. Cross sectional surveys

Surveys randomly select from an identified population in a given time period. Good response rates are important to ensure results are accurate. Surveys are a major source of epidemiological data.

6. Case reports

A report based on a single patient or series of patients. This is an important method for identifying rare or new events.

7. Expert opinion

A consensus view provided by respected and experienced individuals.

8. Anecdotal information

Something told after a meeting or at a party.

This ranking hierarchy moves from simple observational methods at the bottom through to increasingly statistically refined and complex methodologies at the top.

There are two points to consider in relation to this hierarchy:

1. Techniques that are lower down the ranking often have great value. For example, the hazards of smoking have been well established and the evidence is considered strong even though randomised trials were not conducted. For ethical reasons it is not feasible to expose people to suspected hazards, so planners are often restricted in how studies can be conducted. Here a cohort is needed – a group exposed to the agent by chance or their own choice and who can be a comparison in terms of how they fare when compared with another group who were not exposed. It is not simply that one method is better: a given type of question may demand a specific methodological approach.
2. This hierarchy may change, and there is debate over relative positions. Traditionally, the randomised controlled trial has been regarded as the most objective method of removing bias and producing comparable groups. But the technique is often slow and expensive and produces results that are difficult to apply to real situations.

The hierarchy of evidence helps understand how valid evidence is. This is important because validity is one of the decision points in gathering information for a planning initiative. The reliability of the information and its applicability must also be considered.

Evaluating Websites

Traditionally most literature reviews concentrate on hard copy journals. But increasingly, a thorough search must include the Internet. Rules for assessing the quality of such material are not yet well developed, but the following tools may help:

The URL

.com and .co addresses suggest commercial bodies; .org suggests non-profit making sites; .edu and .ac suggest academic institutions; .gov, .doh etc. suggest government departments.

The Distributed National Electronic Network

A managed environment for accessing quality assured information resources on the Internet that are available from many sources: journals, monographs, textbooks, abstracts, manuscripts, maps, music scores, and audio-visual. See: http://www.jisc.ac.uk/pub99/dner_vision.html.

Discern

Checklist of 16 questions for consumers and patients to evaluate websites, developed, standardized and validated by working with 13 national self-help groups: may be very time consuming and subjective. Also, seems to assume that consumers accept that care should be based on subjective studies and understand principles of “evidence-based practice.” See: http://www.discern.org.uk/discern_about_this_site.htm.

Health Information Quality Assessment Tool

An “automated” site: the user can call up a website, and work through a twenty-question evaluation. The tool then “passes” or “fails” the site and comments on its strengths and weaknesses: <http://hitiweb.mitretek.org/iq/>.

Health On the Net Foundation (HON)

An international, charitable body based in Geneva. It provides a database of evaluated health materials and promotes the use of the HON code as a self governance initiative to help unify the quality of medical and health information available, and its logo as a mark of adherence to these guidelines: <http://www.hon.ch/>.

Performing a Literature Search

Readers can conduct their own literature searches to find original peer reviewed research articles. However, the following resources may help.

Articles on Navigating the Literature

The following three articles will assist in understanding how to search for relevant literature:

- How to read a paper: *The Medline database* is a paper that introduces non-experts to finding medical articles and assessing their value. It is a good place to start. This paper can be accessed at <http://bmj.bmjournals.com/archive/7101/7101ed.htm>.
- *Searching the Medical Literature* is another brief article that provides tips on conducting Medline searches. The article is at <http://ip.bmjournals.com/cgi/content/full/9/2/103>.
- *Searching Medical Literature for the Best Evidence* is an online tutorial that clarifies the process of collecting evidence from the literature to improve the quality of clinical decision-making. This is done by looking at analysing questions, formulating search strategies, and locating the best sources of information. The tutorial is at: <http://www.library.usyd.edu.au/subjects/medicine/tutorials/ebmtut>.

PubMed

PubMed, a service of the U.S. National Library of Medicine, includes over 15 million citations for biomedical articles back to the 1950s. These citations are from MEDLINE and additional life science journals. PubMed includes links to many sites providing full text articles and other resources. It is found at: <http://www.ncbi.nlm.nih.gov/PubMed>. The website includes a web-based learning tutorial that shows readers how to search PubMed.

PubMed Search Tips:

1. Choose broad terms and concepts and then combine concepts by “AND” or use limiters to focus information retrieval on a manageable number of citations. For example physical activity and obesity.
2. Use “OR” to combine related concepts, to expand/increase recall.

3. Identify MeSH terms by using PubMed’s MeSH Browser.
4. Do not use “Subheadings” initially. Run the search without subheadings and then use limiters to narrow. If the search result is still too large, it can be narrowed through subheadings. (To see a list of available subheadings for MeSH terms use PubMed’s “MeSH Browser”).
5. Use the “Related Articles” feature on Internet versions of MEDLINE. Clicking on “Related Articles” will cause MEDLINE to retrieve citations similar to those in the user’s current search set. MEDLINE will compare the words from that search set’s title and abstract fields and then try to find related citations from 1966 onwards. The resulting set is displayed in ranked relevancy, meaning that those citations that most closely match will be displayed first.

BioMed Central

BioMed Central is committed to providing immediate free access to peer-reviewed biomedical research. All the original research articles in journals published by BioMed Central are immediately and permanently available online without charge or any other barriers to access. All research articles and most other content in BioMed Central’s journals are fully and rapidly peer-reviewed. BioMed Central has a portfolio of over 100 journals. Its website is at: <http://www.biomedcentral.com/browse/bysubject>.

Journal Citation Reports – Science

These reports give a complete listing of current scientific journals, their mandates and their impact factors. The site leading to access to these reports is at: <http://www.isinet.com/products/evaltools/jcr>.

Peer Reviewed Journals

Many peer reviewed journal articles are available free of charge on the Internet. This website provides links to many journals and free access to some of them: <http://pacs.unica.it/full.htm>.

Resources for Critical Appraisal

Definition:

- **Critical appraisal** is the process of systematically examining research evidence to assess its validity, results and relevance before using it to inform a decision.
- **Critical appraisal** allows us to make sense of research evidence and this begins to close the gap between research and practice.

What is critical appraisal? Hill A. and Spittlehouse C. 2001. Available from: <http://www.jr2.ox.ac.uk/bandolier/index.html>

The following resources provide assistance with the critical appraisal process.

British Medical Journal: How to Read a Research Paper

The British Medical Journal has compiled a collection of papers on how to read a research paper, found at: <http://bmj.bmjournals.com/collections/read.shtml>.

Critical Appraisal of the Journal Literature (Kent University, UK)

Hosted by the Templeman Library at Kent University, this website contains a description of critical appraisal, a tutorial on how to do a critical appraisal and various sections on applying critical appraisal to different types of research (e.g., cohort studies, economic analysis and health services research). The website is found at: <http://library.kent.ac.uk/library/info/subjectg/healthinfo/critapprais.shtml>.

Centre for Health Evidence (Edmonton Alberta)

This website provided by the Centre for Health Evidence contains a list of users' guides to evidence-based practice. The guides are divided into two groups: primary studies and integrative studies. Tools and resources that used to be associated with these guides, including calculators and worksheets, are hosted by the Journal of the American Medical Association on a new website at: <http://www.usersguides.org>. For information on the user guides themselves, see: <http://www.cche.net/usersguides/main.asp>.

TRIAGE Critical Appraisal (Trent Institute for Health Services Research, UK)

The Trent Institute for Health Services Research hosts this critical appraisal website. By going to this website readers will find general critical appraisal documents, tutorials, tools, discussion groups, a collection of critically appraised topics (CATs), diagnostic instruments and information on how to critically appraise different types of research (i.e., economic evaluations, meta-analyses, reviews). The website is found at: <http://www.shef.ac.uk/scharr/triage/index/critic.htm>.

Critical Appraisal Skills Programme (Public Health Resource Unit, National Health Service, UK)

The Critical Appraisal Skills Programme (CASP) is a programme within Learning and Development at the National Health Service's Public Health Resource Unit. CASP aims to enable individuals to develop skills to find and make sense of research evidence, helping them to put knowledge into practice. This website contains many critical appraisal resources, including appraisal tools for different types of research. It can be accessed at: <http://www.phru.nhs.uk/casp/casp.htm>.

Cochrane Reviews

The Cochrane Collaboration was formed in response to the need for the best evidence to influence health care practice. The Collaboration's aim is to prepare and maintain systematic reviews of the effects of health interventions and to make this information available to practitioners, policy makers and consumers.

The (electronic) Cochrane Library houses these systematic reviews organized under topic headings. It also includes a register of trials referenced in these reviews.

Abstracts of completed Cochrane reviews and reviews in progress (protocols) are available free at the Collaboration's site. Synopses (plain language summaries of the content of reviews) are available at present for almost 50% of the published Cochrane reviews. The website is found at <http://www.cochrane.org/reviews/index.htm>.

The Effective Public Health Practice Project (EPHPP)

The Effective Public Health Practice Project (EPHPP) is a key initiative of the Public Health Research, Education and Development (PHRED) Program. PHRED is an organization that focuses on public health research, evaluation, education and policy development in Ontario. It is linked to regional PHREDs affiliated with teaching health units in Ottawa, Middlesex-London, Hamilton, Kingston Frontenac and Lennox & Addington, and Sudbury & District.

EPHPP is jointly funded by City of Hamilton Public Health Services and Ontario's Ministry of Health and Long-Term Care. It conducts systematic reviews on the effectiveness of public health interventions, and summarises recent, high quality reviews produced by others. Although EPHPP reviews focus on public health interventions, review methodology and results are frequently of interest to a broader audience of service and research professionals. Its website is at: <http://www.myhamilton.ca/myhamilton/CityandGovernment/HealthandSocialServices/Research/EPHPP>.

Centre for Reviews and Dissemination

The Centre for Reviews and Dissemination (CRD) was established in January 1994 at the UK's University of York. CRD provides research-based information about the effects of interventions used in health and social care. Its website is found at: <http://www.york.ac.uk/inst/crd/index.htm>.

Evidence-Based Clinical Prevention

This website is a practical guide to health care providers, planners and consumers for determining the inclusion or exclusion, content and frequency of a variety of preventive health interventions, using evidence-based recommendations of the Canadian Task Force on Preventive Health Care (CTFPHC). It is at: <http://www.ctfphc.org>.

The EPPI-Centre database for promoting health effectiveness reviews

The EPPI-Centre, affiliated with the UK's University of London, was established in 1993 to address the need for a systematic approach to the organization and review of

evidence-based work on social interventions. The work and publications of the Centre engage health and education policy makers, practitioners and service users in discussions about how researchers can make their work more relevant and how to use research findings. EPPI-Centre's database can be searched at: <http://eppi.ioe.ac.uk/EPPIWeb/home.aspx?Control=Search&SearchDB=rore&page=/hp>.

Health Development Agency (HDA) Evidence Base

The Health Development Agency (HDA) Evidence Base is an information resource developed by the UK Health Development Agency to support one of its core functions: to build and disseminate the evidence base for public health, focusing on reducing inequalities. Its website is found at: <http://www.hda-online.org.uk/evidence>.

Health Evidence Bulletins – Wales

The Health Evidence Bulletins – Wales are produced by the Support Unit for Research Evidence (SURE) at Cardiff University in Wales. The bulletins act as signposts to the best evidence across a broad range of evidence types and subject areas.

Where information from randomised controlled trials is available it is included. However, many health issues do not lend themselves easily to investigation, or have not yet been studied, by this method. In these cases, high quality evidence has been sought from observational and other studies. Its website is found at: <http://hebw.uwcm.ac.uk>.

NHS Centre for Reviews and Dissemination – Economic Evaluation Database

The Economic Evaluation Database was created by the UK's National Health Service (NHS) to assist decision-makers by systematically identifying and describing economic evaluations, appraising their quality and highlighting their relative strengths and weaknesses. The website is found at <http://www.york.ac.uk/inst/crd/nhsdhp.htm>.

Evidence-Based Clinical and Public Health Websites

WEBSITE	ADDRESS	DESCRIPTION
Ontario Guidelines Advisory Committee (GAC)	http://www.gacguidelines.ca	<p>The <i>Guidelines Advisory Committee (GAC)</i> is empowered by the <i>Ministry of Health and Long-Term Care</i> and the <i>Ontario Medical Association</i> to promote evidence-based health care in Ontario, by encouraging physicians to use the best available clinical practice guidelines.</p> <p>The GAC endorses each recommended guideline following an in-depth review. Summaries of the guidelines rated most highly and links to all available guidelines are provided.</p>
Best Practice Initiative (from the Assistant Secretary for Health, US Department of Health and Human Services)	http://www.osophs.dhhs.gov/ophs/BestPractice/	The Assistant Secretary for Health is showcasing best practices in public health from around the U.S. to foster an environment of peer learning and collaboration.
National Institute of Health (NIH) Best Practices in Public Health ListServ	http://list.nih.gov/archives/ashbestpractices.html	Since April 2003 the NIH has hosted a listserv for individuals and groups to post reports and initiatives in the area of best practices in public health.
Center for Disease Control (CDC) Recommends: The Prevention Guidelines System	http://www.phppo.cdc.gov/cdcRecommends/AdvSearchV.asp	<i>CDC Recommends</i> is a searchable storehouse of documents containing CDC recommendations on a variety of health, prevention, and public health practice issues.
Centers for Medicare and Medicaid Services (CMS) – Healthy Aging Initiative – Evidence Reports	http://www.cms.hhs.gov/healthyaging/evidreports.asp	CMS has produced evidence reports that synthesise scientific evidence on how to improve the delivery of Medicare clinical, preventive and screening benefits. Evidence reports also explore how behavioural risk factor reduction interventions such as smoking cessation might be implemented in Medicare. CMS expects that these evidence reports will provide important information to Quality Improvement Organizations, individual health plans, providers and purchasers, including Medicare and Medicaid, and the health care system as a whole to help improve the delivery and quality of preventive health care for older people.
Canadian Health Services Research Foundation	http://www.fcrrs.ca/knowledge_transfer/pdf/Web_Resources-Summaries_Synthesis_e.pdf	This site contains a list of selected free web-based resources considered to be reliable sources of scientific evidence and information relevant to the Canadian healthcare system. The list highlights sites deemed relevant to decision makers in the Canadian healthcare system, and could be helpful when searching for evidence that might contribute to understanding of particular problems, or issues about the best use of resources within institutions and across the healthcare system.

Evidence-Based Planning Guide

Evidence Plan

1. What do I need to know?

(There may be several questions, requiring separate guides to identify evidence.)

Q. _____

Q. _____

2. I need evidence for:

(Check all that apply. Refer to Module for definitions & optimal evidence types)

- Planning
- Monitoring
- Management
- Evaluation

3. What types of information do I need?

- Population
- Provider

4. What is the planning horizon?

Number of years _____

5. Is the projected need:

Current services pattern weighted by change in target population?

Explain: _____

Change in service pattern?

Explain: _____

Information Summary

	Reference ⁱ	Methods ⁱⁱ	Findings ⁱⁱⁱ
Epidemiological			
Administrative			
Journal			
Reports (including web-based reports)			
Advice			

i. Title and author, web address, agency or organization. Specify here if information is from a primary source and analysed specifically for the project.

ii. Identify methods used in creating the information used.

iii. Describe the findings that are related to the project.

Conclusions:

Evaluation

A. Does the evidence used produce valid planning information? [Validity]

Are the conclusions justified by the description of the methodology and the findings? Are the methodologies sound? Have the authors made reasonable assumptions? Are there confounding factors they have failed to consider? Is there a good balance of information suitable to the type of questions being asked?

B. What are the results? [Coherence]

What are the findings? Are effects, differences or trends demonstrated large enough to be of significance or importance? Are the results within the bounds of reasonable expectation and are not a mere fluke? Does the pattern of results paint a coherent picture, or are there contradictions and new questions arising.

C. Will the results help locally? [Applicability]

Does the evidence sufficiently describe areas of concern and populations of interest, or do findings have to be extrapolated? Can I generalise from this evidence to answer my questions?

Notes

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