

If / Then

a practical guide to risk assessment of public programs



by Mark Schacter

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About the Author

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In the 1990s Mark was on the staff of the World Bank at its headquarters in Washington DC; he worked in Africa, Asia and Eastern Europe to help strengthen the governance and accountability of major public institutions, and to support reforms in private sector development. Subsequently, he occupied senior positions at the Institute On Governance and the Conference Board of Canada, both in Ottawa, before launching his consulting firm, Mark Schacter Consulting, in 2003.

Mark has a BA from Yale University, an LL.B. from Oxford University and an MBA from the University of Ottawa.

Note to Readers

This paper is written for anyone who wants to improve his or her understanding of basic concepts and techniques in risk assessment. It is not targeted to experts (for whom the level of discussion is too elementary). The audience I have in mind is public servants, but the key ideas are also applicable to those who work in the private and not-for-profit sectors.

The paper favors simplicity over detail; brevity over comprehensiveness. I have tried to compress into a few pages ideas and techniques that fill textbooks. There are obviously strengths and weaknesses to such an approach. My rationale is that I wanted to write for people interested in a quick, broad overview of the subject. Those who have the time and need for highly detailed treatments of risk assessment (and other elements of risk management) will have no trouble finding them on the internet and elsewhere.

I assume that lengthy technical treatments of risk management – including, for example, detailed discussions on estimating the probability of risk events and the magnitude of expected impact – will strike many (though certainly not all) readers as ill-suited to their work. My experience suggests that risk assessments built on rough, “back-of-the-envelope” estimates, rather than finely calibrated quantification, are all that can reasonably be expected (and all that makes sense from a cost-benefit perspective!) for the majority of public programs.

*The best laid schemes o' Mice an' Men
Gang aft agley,
An' lea'e us nought but grief an' pain,
For promis'd joy!*

- from *To a Mouse*, by Robert Burns (1785)

1. Why Bother with Risk Assessment?

Good managers make plans. Good managers also accept that plans are often spoiled by external events outside their control.

In view of this, it makes sense to anticipate:

- what undesirable events might happen to spoil your plans;
- how likely it is that such events might occur; and
- how bad the consequences might be if one or more undesirable events were to happen.

Having thought about these questions, you will be in a good position to minimize the negative consequences of undesirable events. You may even decide to alter your plans significantly, or cancel them, if it appears there is an unacceptably high likelihood that your plans will be ruined.

As a good manager you hope for success, but you must also be ready to face risks that may undermine your program. Before designing and implementing measures to control risk (the business of *risk treatment*, addressed only in passing in this paper) you need an overall assessment that helps you determine what the key risks are and the relative importance of each one. Risk assessment is an aid to informed management decision-making. It helps you make sound decisions in response to the many bad things the world will throw at your program.

2. Start with Outcomes

Many kinds of plans occupy the minds of public managers: plans to staff positions, to launch a program, to develop a policy, to request authorities or budgets, etc. For the purposes of risk assessment – as well as other public-management tools such as performance measurement and evaluation – the plans of greatest interest are those related to “outcomes”¹.

Every public program is, at its core, a plan for contributing to outcomes, i.e. changes in society, the economy or the environment that make a positive difference to people. A well conceived public program has its intended outcomes spelled out in advance. They are “part of the plan”;

¹ For more on outcomes, see my papers *Not a Toolkit. Practitioner's Guide to Measuring the Performance of Public Programs* and *Tell Me What I Need to Know. A Practical Guide to Program Evaluation for Public Servants*. They are available at schacterconsulting.com/publications.html

and if the plan is spoiled the intended outcomes won't occur. "Risk", then, relates to the possibility that your program will not contribute to its intended outcomes².

Consider the case of a simple program aimed at raising awareness about the importance of hand-washing as an effective and low-cost way to inhibit the spread of communicable diseases such as the flu. A breakdown of the program into its essential logical steps would look like this:

1. program distributes to office-building managers posters carrying short, simple messages about the importance of hand-washing for public health;
2. building managers display the posters in key locations such as public lavatories, restaurant kitchens, etc.;
3. a significant number of people see the posters and read them;
4. most people who read the posters understand the message;
5. people become more diligent about washing their hands properly;
6. the spread of influenza (and other communicable diseases) occurs more slowly than might otherwise have been the case.

Steps 2 through 6 describe outcomes – social changes expected to happen at least partly as a consequence of what the public program delivers ("outputs"), which in this case is the posters distributed to building managers. Analyzing the program in this way helps clarify the essential risk proposition: i.e., it is your intention that the program will contribute to changing behavior related to hand-washing, but there is a risk that it will not do so.

A well-executed risk assessment has to be grounded in agreement on, and a simple but complete description of, a program's intended outcomes³. In short, outcomes provide the essential point of reference for assessing risk.

3. Control vs. Influence

The key feature of outcomes – the feature that distinguishes them from outputs – is that outcomes are always beyond the control (though not the influence) of the program.

² Throughout the paper I refer only to negative risk, i.e. factors that may have a negative impact on intended outcomes. For the sake of brevity I do not discuss positive risk, i.e. external factors that may cause outcomes to exceed expectations. I do so because it is my experience that public managers focus (for understandable reasons) almost entirely on negative risk. (Positive risk is not what keeps people awake at night!)

³ The best way to ensure a complete and succinct description of a program's intended outcomes is to develop a logic model. This is addressed in *Not a Toolkit* (see footnote 1).

In our example, production and distribution of posters is what the program *does*; this is the only thing it *controls*. Everything else in the list of six steps can never be anything more than a matter of influence. The program may seek to influence, but cannot control, where building managers put the posters, nor whether people read them, understand them or change their hand-washing habits.

In virtually all public programs, outcomes can at best be influenced but never controlled. This is a fundamental truth with profound implications for many aspects of public management, including risk assessment.

Even the best designed, best managed public program faces the significant possibility that its intended outcomes will not happen. Outcomes are therefore always “at risk”. The point of a risk assessment is to indicate clearly and simply the degree to which outcomes are at risk, identify the sources of risk, and thereby give managers a basis for minimizing risks while maximizing the probability that intended outcomes will occur.

4. From Outcomes to Assumptions to Risk

Table 1

Logic Step	Assumptions
1 → 2	- building managers will understand the purpose and importance of posters - building managers will ensure that posters are well placed in appropriate locations
2 → 3	- people will notice and read the posters
3 → 4	- people will understand the message that the posters are intended to convey
4 → 5	- people will respond by paying more attention to hand washing

Because programs influence rather than control outcomes, program design reflects *assumptions* about how the program may contribute to desired social or economic changes. Even if such assumptions are not explicitly stated, they are always present. Assumptions may always be partially or wholly incorrect; assumptions are, therefore, sources of risk. It follows that once you have identified your program’s intended outcomes and their related assumptions, it is a relatively simple matter to identify risks.

Table 1 spells out the major assumptions implicit in the design of the hand-washing awareness program. (The “Logic Step” column refers to the six steps on page 2.) Weakness in any of the

assumptions implies weakness in the program's capacity to deliver its expected contribution to the public good.

Consider for example the assumptions linked to the transition from Step 1 to Step 2. It can't be taken for granted that delivery of the posters will be followed, automatically, by prominent display in appropriate locations. Something has to happen "in between": building managers have to understand the purpose and importance of the posters and then make an effort to ensure that they are well displayed. Moreover, building managers' cooperation has to be obtained even though the posters are likely to be a low priority in relation to their other responsibilities. So the assumption that building managers will play the role expected of them in the program's design is significant; if this assumption fails, so too will the program.

The preceding paragraph highlights an important source of risk in the transition from Step 1 (delivery of posters) to Step 2 (display of posters). Further analysis would reveal additional sources of risk in the other transitions shown in Table 1.

5. Writing Risk Statements

You have now anchored the discussion of risk in program outcomes. This matters because – as noted – the motivation for understanding risks is to put yourself in a good position to ensure your program will contribute to intended outcomes.

You are now ready to go a step further by developing short, precise statements describing individual risks. Risks can't be well managed until they have been isolated and identified, so formulation of these risk statements deserves careful attention.

There is no necessarily "right way" structure a risk statement, but it is important to pick one format and stick with it. Consistency in the way you state risks facing your program will support a consistent approach to assessing the relative importance of each risk, which will in turn facilitate an efficient approach to risk management.

It helps if the format of your risk statements mirrors the basic approach taken to risk assessment. The magnitude of a given risk is normally assessed as a product of: (i) the probability that a harmful event that is outside your control will occur and (ii) the amount of harm the event is expected to cause to the program's intended outcomes. It makes sense, therefore, to use a risk-statement format that reflects these two sides of risk (i.e. the harmful event that is outside your control, and the harm it may cause). The general form of such a risk statement would be:

***If** [event 'X' were to occur], **then** ['Y' harmful consequences may be expected to follow].*

For example:

*"**If** the posters are not well-displayed in high traffic areas of office buildings, **then** not enough people will notice and read them."*

and

“*If* people do not quickly grasp the poster’s message, *then* they will not pay more attention to hand-washing.”

Remember that a risk statement is supposed to describe an undesirable event that *may* (or *may not*) occur. The following, therefore, are *not* risk statements:

“Our reduced communications budget means we will not be able to produce and distribute enough posters to make a meaningful difference to public attitudes about hand washing.”

and

“Building managers are too busy to devote time to ensuring that the posters are properly displayed.”

These are statements of *fact* rather than risk. They describe the current state of affairs, rather than a situation they may (or may not) arise at some future point. They point to immediate issues that must be addressed now rather than to possible situations for which you ought to be prepared.

The harmful consequence described in the risk statement (the “then” portion of the statement) should have a clear link to the program’s intended outcome(s). The following, therefore, is not a well formulated risk statement:

“If the public assumes that the posters were paid for and distributed by building owners, then the Government of Canada will not receive public recognition for the program.”

This risk statement is irrelevant because increased public awareness of the importance of hand-washing – not increased public recognition for the government – is the program’s intended outcome.

The first part of the risk statement should describe an event over which you *do not* have control. The following is therefore not a well formulated risk statement:

“If I do not explain the program to building managers, then they will not make an effort to display the posters properly.”

Explaining the program to building managers is an action within your control. A better statement of the risk would be:

“If building managers do not understand the purpose of the program, then they will not make an effort to display the posters properly.”

When the risk is described this way, explaining the program to building managers emerges as a mitigating action⁴ intended to reduce the probability of the undesirable event described in the “If...” portion of the risk statement.

6. Assessing Probability and Impact

The next step in the process is to estimate the significance of the threat posed to your program’s intended outcomes by each risk.

Suppose you are planning an outdoor picnic for your 5-year-old daughter and her best friends. You want to hold it in a few days time. Your intended outcome is that your daughter and her friends enjoy themselves. You have identified the following risks:

- R1:** *If the weather is bad, then the children will be uncomfortable.*
- R2:** *If the children don’t all play together nicely, then my daughter will be unhappy.*
- R3:** *If one of the children wanders away from the group unnoticed, then the child might go missing.*
- R4:** *If some of the children don’t like the food, then my daughter will feel embarrassed.*
- R5:** *If there are too many ants, then the children won’t enjoy their lunch.*
- R6:** *If the children are very active, then one of them might have an accident and be injured.*
- R7:** *If I lose my contact lenses during the picnic, then I won’t be able to supervise the children.*

For each of the risk statements you need to estimate: (i) the probability that the risk event (“If...”) will occur and (ii) the degree of negative impact the risk event would have on the intended outcome (“then...”).

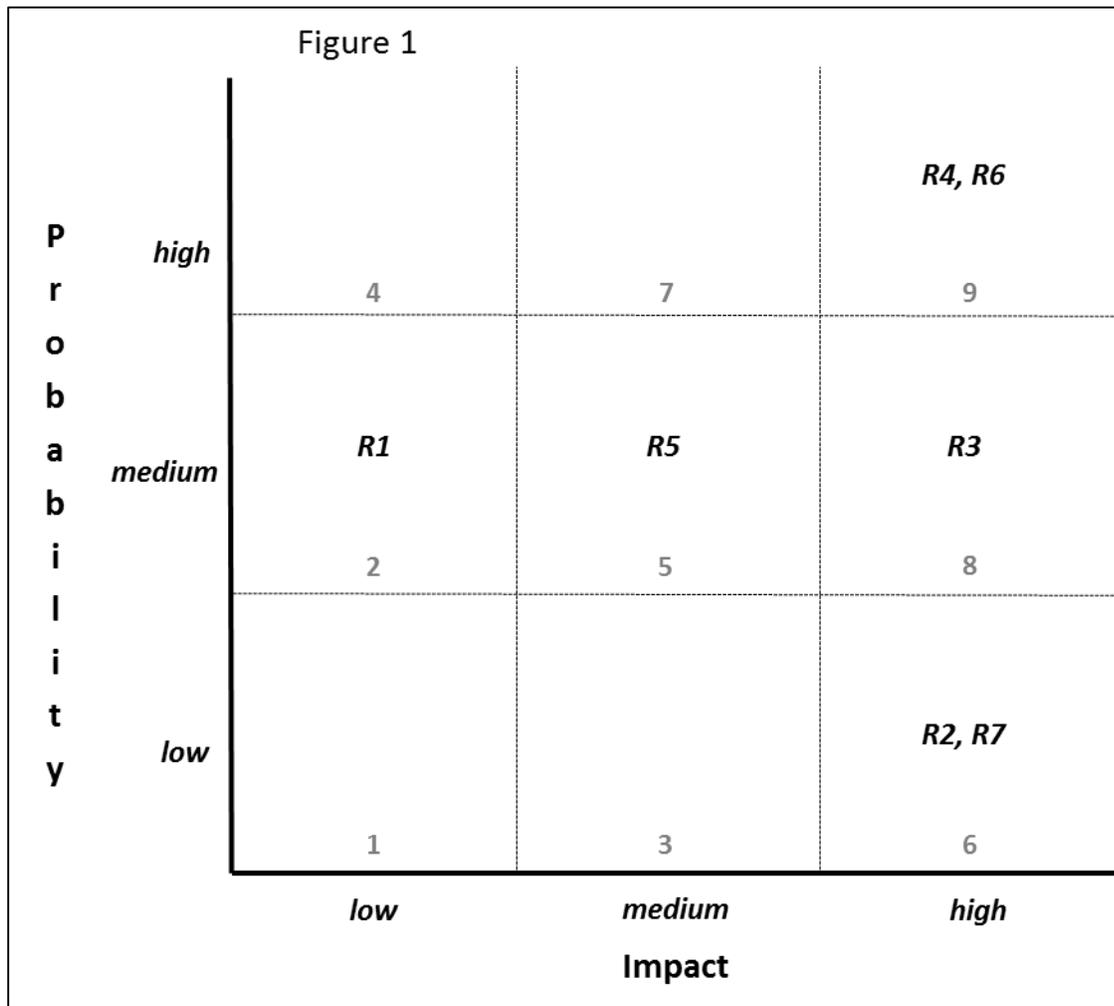
Consider **R1**. What is the probability that the weather will be bad on the day of the picnic? Answering this question is easy. The weather forecast tells you that the probability of rain over the next three days will be 20 percent, 40 percent and 30 percent. You decide to classify this as “medium” probability.

Now you turn to the second part of the risk statement. If it were to rain and the children were to be uncomfortable as a result, how great would the impact be on the intended outcome, i.e. that your daughter and her friends enjoy themselves? You consider what you know about this particular group of children. You believe that even if it were to rain, the children would still have a good time. They are the kind of children who are likely to treat rain as an adventure. You are not worried; you classify the negative impact on the intended outcome as “low”.

⁴ Risk mitigation is discussed briefly in section 8, below.

Consider **R3**. What is the probability that you will become very distracted during the picnic and lose track – even for a very short period of time – of one or more of the children? You have plenty of experience supervising groups of children; moreover, this will be a relatively small group and they are well behaved. On the other hand, you will be in a large outdoor area and there will be many demands on your attention. You decide to classify this as a “medium” probability.

But what if you did lose track of one of the children, and she did wander off and go missing? This would cause great distress to the children (not to mention for you!). The negative impact on the intended outcome – a picnic where everyone has a good time – would be “high”.



You work through each of the risk statements in the same way. Figure 1 – a “risk map” – illustrates one way to display the results of the risk assessment for the picnic.

At this point you may be concerned that the methodology seems weak. With the exception of the weather forecast, the “data” you are using to assess risk are subjective and imprecise. But this alone does not necessarily mean that you are doing a bad job of risk assessment.

The appropriate degree of precision for estimating the probability of a risk event and the magnitude of its impact will vary according to circumstances. Out of the seven risks identified for the picnic, precise estimation is only possible for the “if...” portion of R1 (because the public has easy access to weather forecasts). For the rest, you have no alternative but to build the risk assessments upon a combination of your knowledge, experience, intuition and common sense. You will have to rely heavily on what you know about the children: how they get along with each other, how well they take instruction from adults, how fussy they are about food, etc. You will also work with what you know about your daughter’s personality.

The hand-washing posters program is also a case where rough estimation involving subjective judgment rather than hard data will have to suffice. There is no data set that will tell you how building managers will behave or how people will interpret and respond to the posters. Most public programs are not precise undertakings involving standardized, well specified processes for which risks can be finely calculated. There is nothing to be gained from “over-building” your risk assessment by introducing a level of precision (a 55 percent probability of X; a 60 percent probability of Y, etc.) that cannot be supported either by the nature of the program or by available information.

On the other hand, rough estimation is not always the only available option. If, for example, you work in the field of building codes or municipal zoning, it would be appropriate to expect a high level of precision in risk assessment. Building codes and zoning are responses to risks affecting buildings and the people who occupy them; they are based in part on quantitative assessments of well-known threats. Building codes in regions prone to earthquakes differ from codes in places where earthquakes rarely or never occur. Zoning accounts for the location of natural features such as flood plains. In either case, robust, quantitative, historical data (frequency and severity of earthquakes, floods; damage to property; injuries and deaths) support a precise approach to estimating probabilities and potential impacts on people and property.

Insofar as relevant quantitative data exist and can be obtained at reasonable effort and cost, they should be used for risk assessment. The challenge, however, is that from the perspective of risk assessment, many public programs have more in common with the example of the picnic than with building codes or zoning regulations. In other words, precise and reliable data on the likelihood of risk events and degree of impact is often non-existent or difficult to obtain.

It is important to recognize the limitations of risk assessment when subjective judgment is required. Subjective intuition about risk can be quite accurate in some areas but well off the mark in others⁵. So when you formulate estimates of probability and impact in the absence of quantitative data, it may be wise to test your ideas with others whose judgment you value.

⁵ For example, see <http://www.psychologytoday.com/articles/200712/10-ways-we-get-the-odds-wrong>; also http://www.slate.com/articles/health_and_science/new_scientist/2012/05/risk_intelligence_how_gamblers_and_weather_forecasters_assess_probabilities.html

They too will have subjective biases, of course; but if you gather a range of opinions it is possible that the personal biases will offset each other somewhat, helping you produce a truer picture of risk than you could have developed on your own.

7. Prioritizing Risks

No one has unlimited time and resources to allocate to risk management. But at the same time, not all risks are equally worthy of your attention. Some must be addressed immediately, some can reasonably be ignored, while action on others can be deferred.

Prioritizing risks is therefore the next order of business after you have written risk statements. Three important factors determining the priority of a risk are:

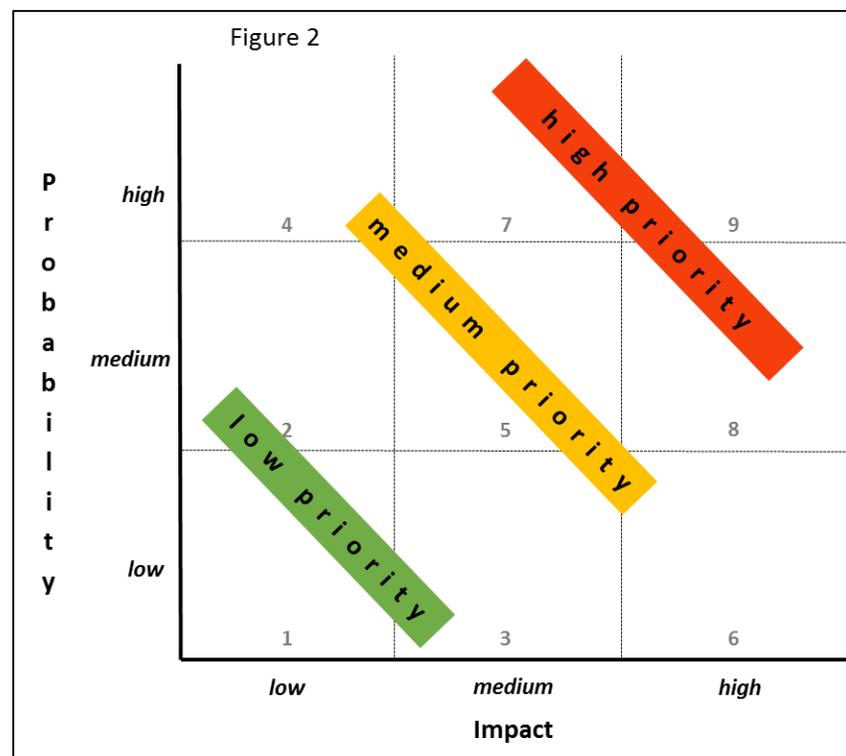
- the probability that the risk event (the “if...” portion of the risk statement) will occur;
- the degree of negative impact expected to be caused by the risk event (the “then...” portion of the risk statement); and
- your risk tolerance.

As a rough rule, the highest priority risks will be those that combine the highest

levels of probability that the risk event will occur, the highest level of impact if the event were to occur, and the lowest level of tolerance by you to the risk in question.

Again, as a rough rule, risks that fall into boxes 1, 2 or 3 of the risk map would normally be considered low priority; risks in boxes 4, 5 and 6 would be medium priority; risks in boxes 7, 8 and 9 would be high priority (Figure 2). This rule-of-thumb is helpful as a starting point, but adjustments will be required on a case-by-case basis to account for risk tolerance.

Risk tolerance differs across individuals and organizations. It refers to the types and levels of risk that people or organizations are willing to accept. Consider, for example, two recreational bicyclists. Tom only rides his bike on paved paths in the city. Mary prefers “extreme” mountain-biking on steep and difficult terrain. Tom says that what Mary does is “too risky”. Mary agrees



that extreme mountain-biking is very risky – the probability of a serious fall is high; the negative impact of a fall would also be high – but she doesn’t see this as a reason to avoid the sport. Mary has high tolerance for the risks of extreme mountain-biking; Tom has low (or no) tolerance.

The effect of risk tolerance on risk prioritization for the picnic is seen in the priorities assigned to **R5**, **R6** and **R7** (Table 2).

The rule-of-thumb suggests that **R5** should be a medium priority risk but you have given it low priority. Why? You accept that ants are an unavoidable feature of picnics and that some of the children may be bothered by them when they sit down to eat lunch. You believe there is little

Table 2

	Probability	Impact	Tolerance	Priority
R1	Medium	Low	Medium	Low
R2	Low	High	Medium	Medium
R3	Medium	High	Low	High
R4	High	High	Low	High
R5	Medium	Medium	High	Low
R6	High	High	High	Low
R7	Low	High	Low	High

you can do about this risk, and will go ahead with the picnic nonetheless. Your tolerance for this risk is high.

The rule-of-thumb says that **R6** ought to be a high-priority risk, but you have rated it low priority. You know that small children are naturally active, exuberant and rather careless with regard to personal safety. No matter what precautions you take, “accidents will happen”. Your tolerance for this risk is high. You will do what you can to ensure that there are no injuries, but you are also not going to be overly worried about them.

The rule-of-thumb suggests that **R7** should be a medium-priority risk but you have given it high priority. Your uncorrected vision is very weak. Even though you cannot remember the last time you lost one (let alone two) contact lenses, the possibility (even if it is very small) that you might lose both your lenses while you are in charge of the children makes you anxious. Your tolerance for this risk is low.

8. From Risk Assessment to Risk Treatment

Now that you have assessed risk, you are in a position to do something about it. You are ready to “treat” (i.e. deal with) risk in a rational way based on the analysis you have just completed. Although risk treatment is a subject unto itself and is not the focus of this paper, I will touch on it briefly in order to make the logical connection with risk assessment.

As a public manager you will usually find that your general options for treating risk are:

- reduce the probability of occurrence of the risk event; and/or
- reduce the negative impact of the risk event on outcomes; or
- proceed with the program making no adjustments for risk; or
- do not proceed with the program.

The first two bulleted points are referred to as “risk mitigation”.

Consider the picnic. Table 2 indicates that there are three high-priority risks to be dealt with immediately: R3, R4 and R7. If you can address at least these risks, you will have gone a long way toward making the picnic a much less risky proposition.

R3: *If one of the children wanders away from the group unnoticed, then the child might go missing.*

Mitigation to reduce probability of risk event occurring: Your original plan was to be the only adult at the picnic. To reduce the probability that one of the children might wander off unnoticed, you will make sure that another parent attends.

R4: *If some of the children don't like the food, then my daughter will feel embarrassed.*

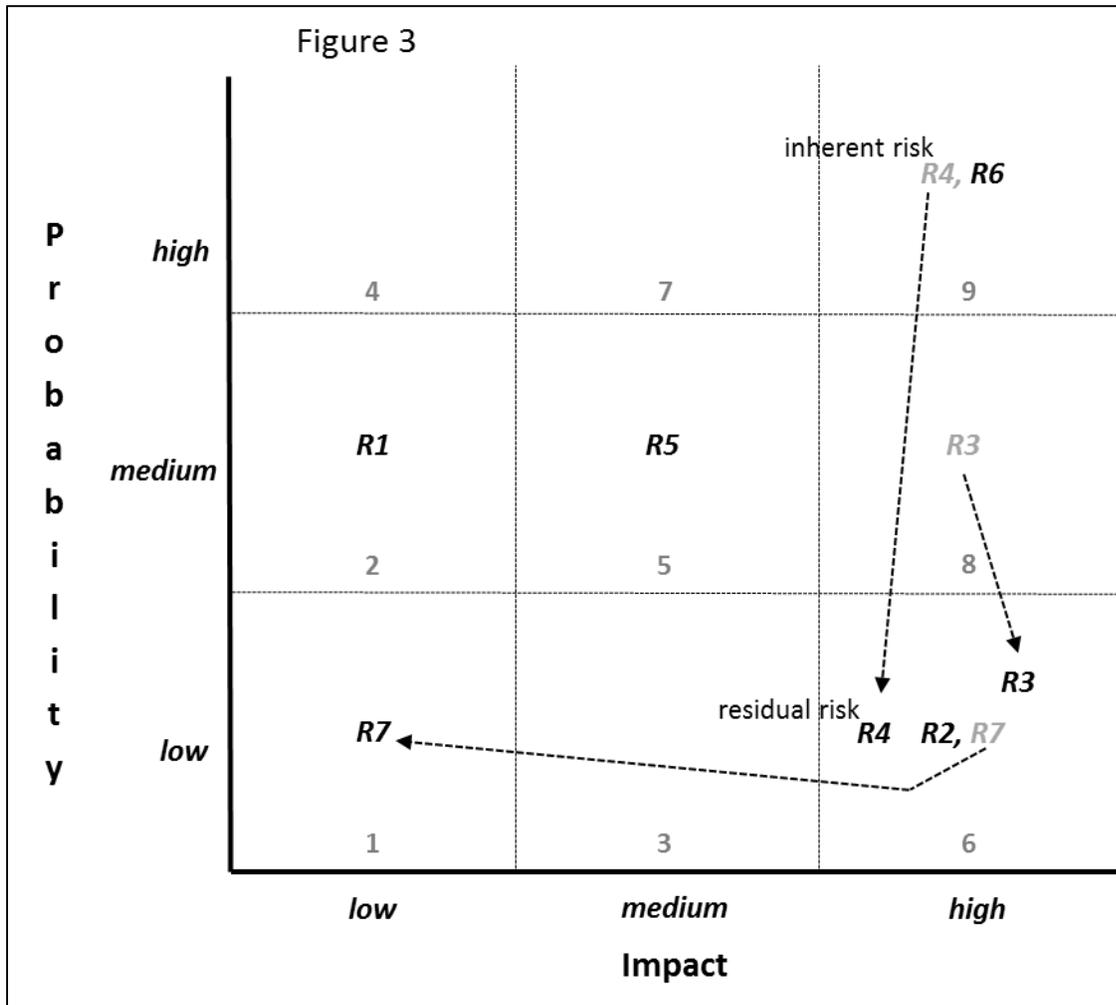
Mitigation to reduce probability of risk event occurring: You will consult with all of the parents in advance to find out about foods their children cannot or will not eat. This will reduce the probability that the children won't like the food.

R7: *If I lose my contact lenses during the picnic, then I won't be able to supervise the children.*

Mitigation to reduce the negative impact of the risk event: You will bring an extra pair of contact lenses and/or a pair of eyeglasses to the picnic. This will negate the impact of losing your contact lenses.

These actions will have significant positive impact on the risk profile of the picnic, as shown in the revised risk map (Figure 3).

- **R3** goes from medium-probability/high-impact (“inherent risk”) to low-probability/high-impact (“residual risk”);
- **R4** goes from high-probability/high-impact to low-probability/high-impact; and
- **R7** goes from low-probability/high-impact to low-probability/low-impact.



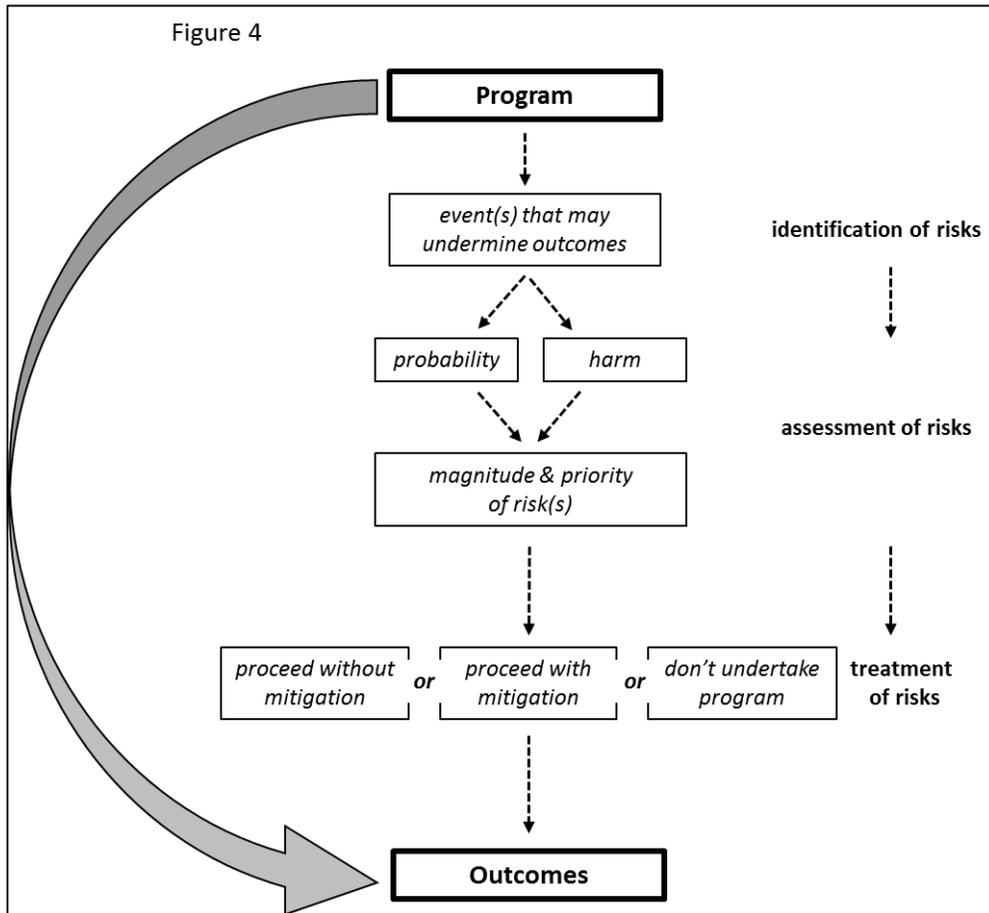
The level of risk before mitigating actions are taken is referred to as “inherent risk”; the level of risk after mitigation is referred to as “residual risk” (Figure 3).

When presenting a risk assessment for a program that is still in the planning stage it may be useful to present an analysis of both inherent and residual risk. This will help you to demonstrate how each proposed mitigating action is expected to have a positive impact on the program’s risk profile.

When presenting a risk assessment for a program that is already in operation you will inevitably be dealing with residual risk, because it is likely that risk-mitigating actions have already been implemented. You may find, however, that the residual risk remains unacceptably high and that further mitigation is therefore necessary. You may also uncover risks that had not previously been identified, in which case you would analyze both inherent and residual risk.

9. Conclusion

In our private and professional lives we constantly take risks, assess them and deal with them. Risk management is so deeply embedded in our daily behavior that, most of the time, we don't even notice we are practicing it.



There are situations, however, where it makes sense to implement a deliberate and structured (rather than an instinctive and undocumented) approach to risk. Public managers are expected to do so; hence, the demand that risk management plans be included in program design and implementation.

This paper has focused on one aspect of risk management, namely risk assessment. A well prepared risk assessment provides a thorough, simple, well structured description of major threats to the success of your program. With this in hand you are ready to take steps that will mitigate risks by reducing the likelihood that the risk events will occur and/or minimizing the

damage to your program if risk events do occur. Figure 4 illustrates the overall risk management context into which risk assessment fits.

Amid the detailed work of writing risk statements, producing risk maps and prioritizing risk, a larger point may too easily be lost: *risk assessment is, above all, a tool for management decision-making*. It is meant to help you make good program-design and program-management decisions that will contribute to program success. “Success” begins and ends with outcomes. It follows that for risk-assessment to be an effective aid to decision-making, it must be grounded in consensus on a program’s intended social/economic outcomes.

The point of risk-management is to increase the odds that your program will make its intended contribution to social/economic outcomes (better health, more jobs, stronger economy, cleaner environment, etc.). The writing of risk statements, drawing of risk maps and the prioritization of risks – all of these must therefore have a clear connection with the program’s expected social/economic benefits.