Utilizing the Advanced Tools of QI to Solve Problems:
Understanding the Challenges Public Organizations Will Face in 2010

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Introduction:

When public health professionals are confronted with complex community health or organizational issues or problems they need to be able to analyze a lot of information quickly and efficiently to make the best possible decisions to solve the issues or problems. The advanced quality improvement (QI) tools[2],[3] help to synthesize lots of information, identify the critical areas to focus on, and guide the decision making process.

As stated by Lao Tse, Chinese Philosopher, "For every complex question there is a simple answer and it is usually wrong." The advanced tools of QI are designed to deal with complex issues in a manner which guides those analyzing the issues to focus on hidden interrelationships that are not obvious without detailed analysis. This detailed analysis guides those analyzing an issue away from the simple answer and into a process of continual refinement of the issue. To make the best possible decisions you need to analyze a lot of information and the advanced tools of QI help you to synthesize and refine information to focus on the critical pieces before developing potential solutions

The advanced tools of QI are vehicles to help us sort through the many interrelated possibilities we have at the strategic level and help narrow them down into the vital few issues to focus our scarce resources upon to make the biggest positive impact on the organization and our community. These vital few issues are usually hidden and not apparent when we first start to explore a strategic issue, but the advanced tools of QI provide the means to focus a team on the few priorities that will move the organization to its desired future state as quickly as possible.

The advanced tools of QI take a system approach of continuous refinement of the issue as we move from one tool to the next in a defined sequence of application. This is a process of constant refinement to help us clearly understand the issue being investigated and its interrelated components. Figure 1 shows the General Approach[4] on how to use the advanced tools of QI in a problem solving sequence to resolve an important

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[2] Management For Quality Improvement: The New QC Tools, S. Mizuno, editor, Productivity Press, ©1988

[3] The Public Health Quality Improvement Handbook, R. Bialek, G. Duffy, and J. Moran, editors, ASQ Quality Press, ©2009, pp 189 – 213.

[4] The Public Health Quality Improvement Handbook, R. Bialek, G. Duffy, and J. Moran, editors, ASQ Quality Press, ©2009, pp 190.

issue/problem. When used in a sequence of application the advanced tools of QI form a dynamic process that helps us to continually refine our issue/problem statement which narrows the scope and the approach to solve it.

General Approach On How To Use The Advanced Tools Of Quality Improvement
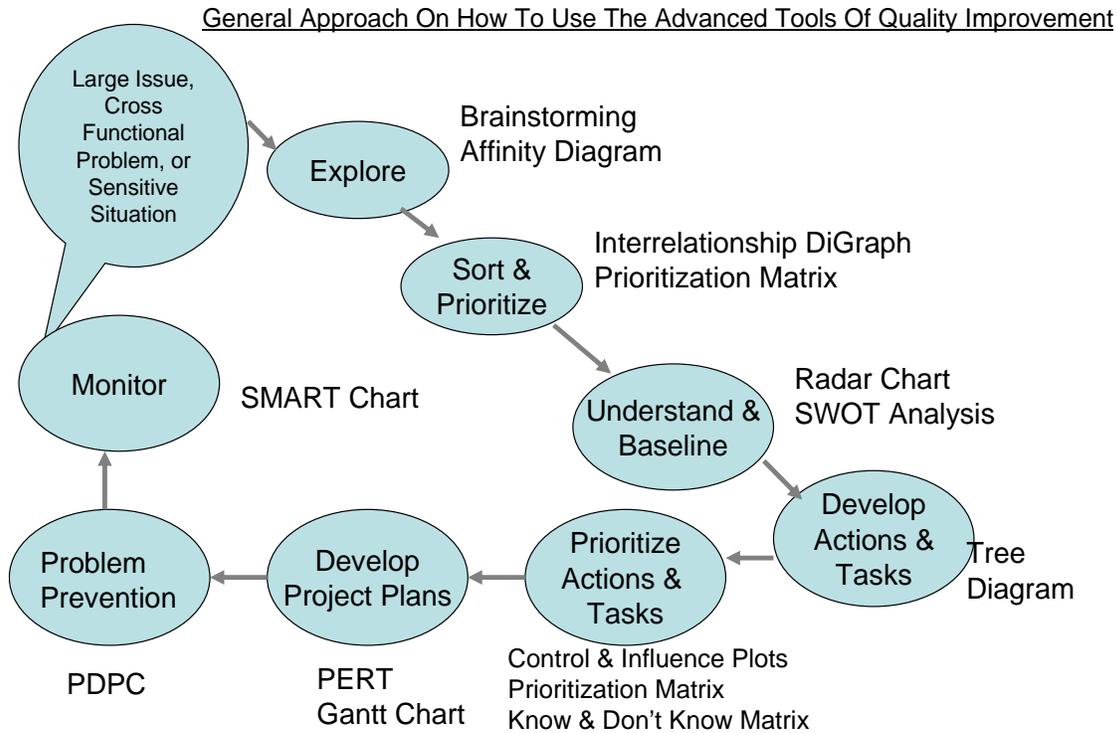

Figure 1

This is a general flow and does not meet all issue/problem situations that could arise. When using the advanced tools of QI a team or individual should think through an approach they would use and then adopt the best sequence of advanced tools of QI to fit the particular situation they are trying to solve.

Recent Application:

At the 2009 APHA annual meeting[5], the authors conducted an interactive workshop on the use of two advanced tools of QI to demonstrate to the participants how they can be used to help them "Understand the Challenges Public Organizations Will Face in 2010."

The two tools utilized during the workshop were the Affinity Diagram[6] and the Interrelationship Digraph[7]. They were used to demonstrate how to surface issues around

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[5] The 137th American Public Health Association Meeting and Exposition, November 7 – 11, 2009, Philadelphia, PA.
[6] The Public Health Quality Improvement Handbook, R. Bialek, G. Duffy, and J. Moran, editors, ASQ Quality Press, ©2009, pp 193 – 195.

the "Challenges Public Organizations Will Face in 2010" and then how to understand how the various issues that surfaced are related.

Affinity diagramming is a tool for gathering, grouping, organizing and understanding large amounts of information and helps to identify and draw out common themes from the information which will show any hidden linkages. Affinity diagramming partners well with brainstorming to organize a large number of ideas/issues.

The process to develop an affinity diagram used for this workshop was as follows:

1. Developed and posted a broad clear issue statement that focused the group at the macro level. The issue was "What are the Challenges Public Health Organizations Face in 2010?"
2. The workshop participants started with individual silent brainstorming and recorded each of their ideas on a Post-It® note making sure that each statement was a complete statement.
3. Then each participant read and randomly posted their ideas on the flip chart paper that was posted on the wall. The participants were instructed not to place their ideas in any order since we do not want to suggest any patterns, categories or headings in advance. They used the whole posting area to randomly post ideas. During this part of the process other participants asked for clarification when an idea was read, but there was no debate, just clarification.
4. Once all the ideas were posted the participants did a silent consensus process by doing the following:
   - The entire team gathered around the posted notes
   - There was no talking during this step
   - Individuals looked for ideas that seemed to be related in some way
   - Post-Its® that seemed to be related were moved around and placed side by side
   - These steps were repeated until all notes were grouped
   Note: It is okay to have "loners" that don't seem to fit a group – these are outliers. It is alright to move a note someone else already moved. If a note seemed to belong in two groups, it was okay to make a duplicate note and post it in both groups.

5. After the ideas were grouped the participants discussed what the grouping patterns showed or uncovered and then developed a heading for each grouping of ideas. The heading that was placed at the top of a group of ideas had to clearly describe the group and was highlighted in a bright color to distinguish it from the ideas under it. It is important for headers to be clear and descriptive and that accurately describe the grouping of ideas they represent. It also is important to take the time to do this step well since it is the foundation for the other tools in the process. An example of affinity diagramming is shown in Figure 2.

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[7] The Public Health Quality Improvement Handbook, R. Bialek, G. Duffy, and J. Moran, editors, ASQ Quality Press, ©2009, pp 199 – 201.

Issue Statement

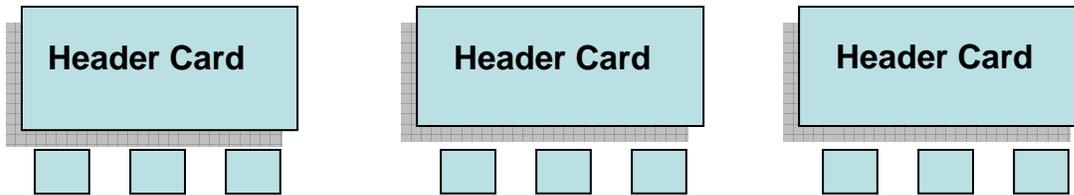What are the Challenges Public Health Organizations Face in 2010?

| Header Card | Header Card | Header Card |

Figure 2

The output of the participants' affinity process resulted in six header categories as shown in Table 1.

Table 1

What are the Challenges Public Health Organizations Face in 2010?

Header Card	Post-It® Notes In Each Grouping
1. Lack of Funding	Increase competition for funding
	Budgets will continue to be cut
	Organizations often deal with unfunded mandates
	State fiscal woes mean unfunded and underfunded good PH plans will continue to be not done.
	Staff burnout and low morale
	Loss of workers to private sector
2. Branding Public Health	Develop the identity of Public Health
	Public Health not valued as other branches of health care
	Get the message out of what we do
	Inform the community of our value
	Limited/lack of understanding by community of their needs and desires – we need to educate
	Communicate prevention values
3. Lack of Alignment of Services, Prevention, and Policies	Older adult population will demand large amount of health care resources – will we be able to provide care to them
	Focus of health care reform will be on medical care and

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	insurance and not primary prevention
	Health reform should create a need for prevention and health promotion
	Governmental policies that emerge (such as health care reform) that may influence the organization's practice
	Need for access to health care for all
	Needs of immigrants will increase – culturally competent approaches
4. Need for Support for Infrastructure Development	Electronic media requires new skills and investment – Face Book, Twitter, SMS, etc.
	Lack of adequate infrastructure
	Technology requires investment which may not be possible with budget cuts
	Many PH departments have poor work environments
5. Need for Workforce Development	Workforce shortage in near future
	Too few entering public health field
	Large turnover
	Workforce is aging and retiring
	Need to develop new leaders
	New skills needed in electronic age
	Broadening PH education
	Help address recruitment and retention problem
	Workforce needs an adequate infrastructure to apply their skills
6. Need for Public Health Crisis Management	Unanticipated crises will occur – e.g. H1N1
	Too many competitive priorities – all are important – which do you address first
	Issues that emerge (such as a natural disaster or H1N1) that challenge organizational capacity
	New emergences of infectious diseases
	Workforce needs new types of leadership skills

Once workshop participants agreed on the affinity categories an Interrelationship Digraph (ID Graph) was used to help visualize how the various group headings of the issue "What are the Challenges Public Health Organizations Face in 2010?" are related and discover any hidden linkages. The process to develop an ID Graph is as follows:

- Use the header cards from the affinity diagram and spread them out on a large work surface covered with flip chart paper.
- Start with one header card and compare it to all the other header cards. Continue this process until all the header cards have been compared to all the others.
- When comparing header cards use an "influence" arrow to connect related header cards.
- The arrows should be drawn from the header card that influences to the one influenced. A question to ask when comparing header cards is:
  - Does this card cause any others to happen or is it a result from another card(s). If the answer is *"yes"* draw an arrow connecting them. If the answer is *"no"* do not draw an arrow connecting them and move on to the next paired comparison.
- Then determine the strength of the relationship by assigning a "1" for a weak relationship, a "5" for a medium relationship and a "10" for a strong relationship.
- Use only one way arrows. The arrow should point toward the effect and away from the cause.
  - Outgoing arrow = basic cause – if solved spillover reaction on a large number of other issues
  - Incoming arrow = secondary issue or bottleneck
- Once all the comparisons are completed count the number of In Arrows, Out Arrows, and the total strength assigned for each header card. An example of one set of comparisons developed by the workshop participants is shown in Figure 3.
- The header card with the most outgoing arrows and highest strength will be a driver or root cause. The one with the most incoming arrows and highest strength will be a bottleneck, outcome, or result
- The tabular results of the arrows and strength can be captured on the ID Graph, but it can be seen that as the number of comparisons increase the graph will become messy and difficult to follow. To help with the analysis a matrix summary diagram is employed to show the relationships and strengths among all the header cards as shown in Figure 4.
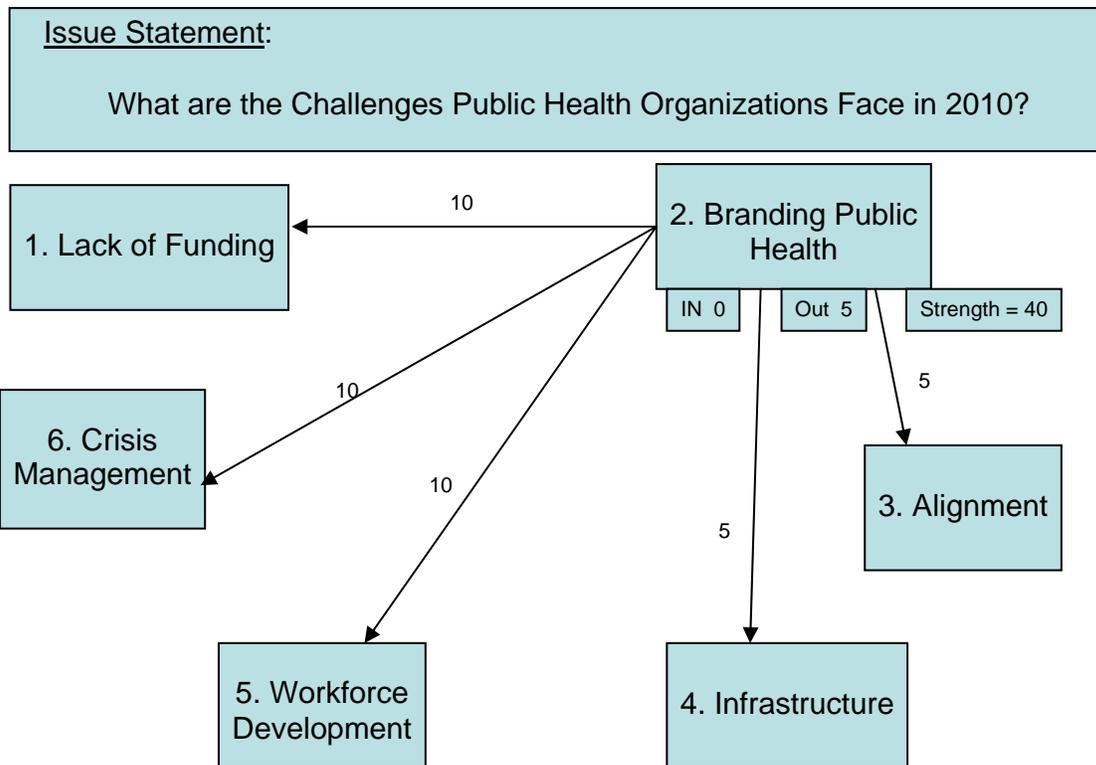
Issue Statement:

What are the Challenges Public Health Organizations Face in 2010?

Figure 3

ID Matrix Summary

	1	2	3	4	5	6	# In	# Out	Strength
1. Lack of Funding		← 10	↑ 5	↑ 10	↑ 5	↑ 5	1	4	35
2. Branding PH	↑ 10		↑ 5	↑ 5	↑ 10	↑ 10	0	5	40
3. Lack of Alignment of Services, Prevention, and Policies	← 5	← 5				← 5	3	0	20
4. Support for Infrastructure	← 10	← 5			↑ 10		2	1	25
5. Workforce Development	← 5	← 10		← 10		↑ 10	3	1	35
6. Need for PH Crisis Management	← 5	← 5	↑ 10		← 10		3	1	30

Figure 4

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One thing that is not captured in the ID process is the rich conversation that takes place during the development of an ID Graph which is very valuable since people are exposed to a wide variety of knowledge and experience of the other participants to help them in their decision making.

Analysis:

As can be seen in Figure 4, the main driver of the header cards utilized was the Branding of Public Health which had the highest strength and was a driver of all the other categories. The participants felt that this category contributed to the lack of funding which was the next main driver in the system. The participants felt that if public health departments did a good job of getting the message out to the community as to what they do and accomplish, there would be more support for adequate funding. The ID Matrix also shows that the header category Lack of Alignment of Services, Prevention, and Policies was a bottleneck since all the arrows to the category were incoming and nothing was going out. This is a category to focus on as improvements are being considered to make sure it will be ready to handle proposed changes to improve the entire system. If potential bottlenecks are not addressed as part of the solution process they can delay improvements to the overall system.

The next step in the process, which was not covered in the workshop because of time constraints, is to take the top prioritized header cards and detail them into action steps using a tree diagram that provides potential solutions to that header card. When the tree diagram is being constructed on a prioritized issue this is when the team can gather data and evidence to support the interrelationships that were defined to ensure they are valid. This step is a check on decisions made as to what to focus on before developing solutions to the original issue. It is always best to verify and validate with data and evidence whenever possible to ensure the team is making quality decisions.

Summary:

The output from this exercise was the synthesis of those who participated in this workshop from many different health departments and with different concerns and challenges, and perspectives. The participants were able to apply the lessons of the presentation to a practical issue that is faced by the public health community. As the participants experimented with the Affinity Diagram, they were able to work with new colleagues in the session and organize their thoughts in logical groups in a manner that allowed the group to come to consensus. The participants also practiced moving from the Affinity Diagram to the Interrelationship Digraph (ID Graph). In the second activity with the ID Graph, participants were able to see the relationships between the issues that will challenge public health in 2010. The process of determining how the identified issues related to one another and the direction of the impact from one issue to the other was somewhat challenging to do in the short period of time. Consensus on this exercise took additional time to reach. Also, participants struggled identifying a one way direction for the arrow from one issue to the next. The exercise was time bound by the workshop's

length and there is a possibility that other categories could have resulted with more time devoted to the process.

We encourage you to try this exercise and the tools with your staff to help your organization understand and develop approaches to the challenges it will face in 2010.