

Applying the Concept of Positive Deviance to Public Health Data: A Tool for Reducing Health Disparities

Lorraine O. Walker, Bobbie Sue Sterling, Mary M. Hoke, and Kirk A. Dearden

ABSTRACT The concept of positive deviance (PD), which highlights uncommon practices that reduce risk in low-resource communities, has been effective in community mobilization and programming to improve health outcomes. We present a protocol for extending the concept to analysis of existing public health data. The protocol includes assessing whether PD fits the situation, identifying positive deviants, and identifying behaviors associated with positive deviants' healthy outcomes. Analyzing existing datasets from a PD perspective may aid public health nurses in efforts to reduce health disparities. The effectiveness of our protocol will be clarified in future research.

Key words: health disparities, method, nutrition, positive deviance.

Interventions based on local knowledge have the advantage of fitting community characteristics and building on community assets. In this paper, we introduce the concept of positive deviance (PD) and propose a protocol to assist public health nurses to capitalize on local knowledge as they work to reduce health disparities. PD reflects the uncommon but healthy practices that permit some individuals to thrive when their equally at-risk neighbors do not (Marsh, Schroeder, Dearden, Sternin, & Sternin, 2004). For example, in Vietnam, program planners

found that a few poor mothers who fed their children uncommon but available foods—shrimp, crabs, and greens from rice paddies—were able to protect them from malnutrition. Designing nutritional interventions based on a PD approach, using specific community mobilization strategies resulted in dramatic, sustained improvements in the growth and nutrition of at-risk children there (Mackintosh, Marsh, & Schroeder, 2002).

Evidence of the power of PD has extended its use beyond child malnutrition to other health problems (Marsh et al., 2004). The strengths of current field applications of PD stem from focusing on local assets, and actively engaging communities in the change process as exemplified in the manual of the Nutrition Working Group, Child Survival Collaborations, and Resources Group (CORE Group, 2002). However, the concept of PD may have other potential applications that step outside of traditional field applications, such as use with existing datasets. Furthermore, an intensive process of mobilizing communities to discover local, beneficial practices may not be feasible in some situations because of cost or limited resources, or geographic dispersion. For these reasons, the focus of this paper is on extending the use of the concept of PD to existing local data that may lie unexplored in public health records, surveys, and databases as a foundation

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for intervention planning. We propose a protocol for applying PD to existing data using insights derived from field applications. To aid readers in understanding the protocol, we provide illustrations of our past use of the protocol with data related to postpartum weight retention.

The PD Approach

PD focuses on low-resource communities and those individuals “whose special, or uncommon, practices and behaviors enable them to find better ways to prevent malnutrition [or other health problems] than their neighbors who share the same resources and face the same risks” (CORE Group, 2002, p. 2). These individuals are positive deviants because they differ in a healthy direction from the normative (and less healthy) outcome of their neighbors in the same milieu. One premise of a PD approach is that programs in a given community must be “dependent on available resources” (CORE Group, 2002, p. 1), that is, the starting point is the discovery of *local* solutions using existing resources. As a consequence, interventions are uniquely developed for specific groups or communities and are more likely to be culturally relevant and sustainable (CORE Group, 2002).

The CORE Group (2002) proposed eight steps for applying a PD approach to child malnutrition in field settings. Briefly, the first three include: (1) discerning whether a PD approach is appropriate for a given situation, (2) mobilizing the community and training field staff, and (3) conducting assessments. In the context of malnutrition, program planners and implementers assess children’s weight-for-age, normative beliefs, and practices related to child nutrition, and wealth ranking (to determine risk of malnutrition). Based on these assessments, program planners and community participants identify positive deviants. A fourth step involves conducting positive deviant inquiries, which include intensive observations and interviews of families with positive deviant children (as well as contrasting groups of children) to identify practices contributing to good nutritional status. Subsequent steps in PD programming include designing and implementing “Hearth” nutritional interventions based on the findings, and evaluating progress and outcomes. To develop a PD approach for analysis of existing data, we drew on the data-related steps 1, 3, and 4 in the CORE Group protocol, that is, assessing whether PD fits the situation, identifying positive

deviants, and determining behaviors that contribute to health outcomes. Although analyses of existing or archived datasets do not readily lend themselves to community participation as is done in traditional field applications of PD, we have incorporated input from members of the communities of interest at the data interpretative phase of the protocol.

The PD Approach Applied to Existing Data

Step A. Determine whether PD fits the situation

Many health problems have solutions predicated on large-scale socioeconomic transformation of communities. In contrast, a PD approach emphasizes immediate solutions to improving health outcomes. A PD approach is best suited to situations in which there is a sufficiently high percentage of individuals with poor health outcomes to create a critical mass for program planners. Table 1 presents our three-step protocol with accompanying tasks and subtasks for applying a PD approach to existing data.

Using a PD approach with existing data requires identification of a health problem in a group or community (e.g., high retention of weight after pregnancy) as well as availability of a relevant dataset, such as those available in public health clinics. Because behaviors related to the health problem are essential to the analysis, both the health problem and related behaviors (as well as supporting attitudes, beliefs, and perceptions) are variables that must be included in the dataset. In working with existing datasets, it is usually not possible to add new variables unless the data collection is still ongoing and open to modification. Thus, it is critically important that public health nurses carefully examine datasets they are considering for analysis to see whether the data are sufficiently detailed. Datasets that include some open-ended responses or qualitative data may be more useful and informative than those that include only fixed responses. Finally, a PD approach is relevant if intended interventions focus on individual behavior change (see checklist in Table 1).

To illustrate the use of PD with existing data, we selected the health problem of failure of low-income women to lose weight between 3 and 8 weeks postpartum. For this illustration, we had available a small dataset containing weekly postpartum weights (0–8 weeks) and related behaviors of low-income women

TABLE 1. *Steps in Applying Positive Deviance to Existing Data*

Step A. Determine whether positive deviance fits the situation: check (✓) all that fit

- A specific group or population of interest with a health problem has been delineated
- Existing data are available on the group of interest
- The existing data include information on the health problem of interest
- The data include individuals' behaviors and perceptions relevant to the health problem
- The intended intervention is focused on individual-level change

Step B. Assess the health problem, situation, and risk in the group of interest

1. Assess the health problem in the group of interest
 - a. Analyze the distribution of values or scores for the health problem of interest
 - b. Compare the findings with the data available from other sources
2. Carry out a situational analysis
 - a. Identify situational factors that are potentially relevant to the health problem
 - b. Analyze the normative pattern for these situational factors
3. Define the key risk factor associated with the health problem
 - a. Select the risk factor
 - b. Examine the distribution of the risk factor in the group
4. Identify positive deviants based on risk and health problem cross-classification

Step C. Identify positive deviants' characteristics and interpret findings

1. Propose possible determinants based on the situational analysis
2. Prepare the dataset, including recoding of variables
3. Compare positive deviants with other cases in the dataset
4. Have members of the group of interest help interpret the findings and plan the intervention

($N = 26$). Our intention was to use a PD approach as a first step in developing interventions to help women lose weight retained after pregnancy. Our small dataset met all the qualifications listed in Step A. We also obtained institutional approval for research with human subjects before beginning data analysis.

Step B. Assess the health problem, situation, and risk in the group of interest

Assess the health problem in the group of interest. Several conceptual and descriptive tasks enable public health nurses to identify positive deviants in the dataset. The initial task is to understand the scope of the health problem within the group of interest. Thus, descriptive analysis of the outcome variable, including means, medians, ranges, and frequencies, should be conducted to gain information about the characteristics of the health problem in the group of interest. These and subsequent analyses require that public health nurses conduct statistical analyses themselves or work closely with data analysts in their organization.

Following this initial analysis, data about the health problem in the group of interest should be compared with established norms or standards for normal growth, weight, or other markers of development or health, for example, growth-monitoring

charts for children. When such standards are not available, it is possible to examine existing descriptive data about a given health problem. For our illustration, there are no weight-monitoring standards for the postpartum period. However, the findings from Schauburger, Rooney, and Brimer's (1992) longitudinal study indicate that, following initial fluid losses, women lose about 1.0 kg between 2 and 8 weeks postpartum (~ 0.17 kg/week). While such descriptive data do not carry the same authority as nationally or internationally accepted standards, they do provide reference points for interpreting findings in the group of interest. Preparing a chart that displays the extent of the health problem as well as established norms or available descriptive data is an effective way to summarize findings about the extent of the health problem in the group of interest.

Carry out a situational analysis. The goal of the situational analysis is to understand the normative (common) practices and related beliefs and attitudes pertinent to the health problem in the group of interest. Examples of community practices considered in situational analyses of child malnutrition include feeding, caring, hygiene, and health care practices (CORE Group, 2002). Community norms for such practices are potential determinants of the health

problem. Identifying these norms facilitates subsequent identification of the knowledge, attitudes, practices, and other characteristics that distinguish positive deviants from their neighbors.

To use existing datasets for a meaningful PD analysis, key variables pertaining to health practices and attitudes must be included in the dataset (see Step A). Thoughtful perusal of variables in the database, including numeric and text data, is essential to developing the situational analysis. Delineating broad categories of variables—perhaps through a conceptual framework—may prevent becoming “lost” in the data. Identifying this framework also contributes to later hypothesis and model development in Step C. The outcome of this subtask is a list of variables that constitute potential determinants of the health problem in the group of interest. These identified behaviors, beliefs, and attitudes related to the health problem give direction to the analysis of data that follows.

To use PD with existing datasets, public health nurses should next conduct descriptive analyses (e.g., means for continuous variables; frequencies for nominal variables) using statistical software to summarize normative patterns for factors identified as relevant to the health problem. These findings constitute the normative pattern within which positive deviants will be studied. For text data, nurses can summarize key themes related to the health problem. Such themes can aid in understanding the pathways to the health problem and/or the background characteristics of the group of interest. In our PD analysis, we found overall that postpartum women typically did not avoid high-fat foods, ate at irregular times, and declined in how often they ate a nutritious breakfast.

Define the key risk factor associated with the health problem. The third task in assessing the health problem is to define the key risk factor associated with the problem in the group of interest. This key risk factor, along with the problem threshold for the health outcome of interest, forms the basis for identification of positive deviants.

Although wealth ranking is a common risk factor for malnutrition, it may not be the key factor for all health problems in low-resource groups or communities. For example, proximity to fast food restaurants might be one risk factor for obesity in a community. Thus, it is wise to consider a range of potential risk factors and select the one that is predominant for a given health problem. These risks may be biomedical

or sociocultural. In essence, risks in this context are any factors that prevent a majority of individuals from experiencing healthy outcomes. In our analysis of postpartum weight retention, a key risk factor was exceeding the gestational weight gain guidelines specified by the Institute of Medicine (IOM, 1990; Walker, Timmerman, Sterling, Kim, & Dickson, 2004). More than 40% of low-income women have been reported to exceed IOM guidelines (Schieve, Cogswell, & Scanlon, 1998).

If the identified risk factor is a continuous variable, such as gestational weight, it becomes necessary to specify a cut-point at which the threshold of high potential for risk is crossed. This threshold may be based on scientific consensus, such as the IOM guidelines for gestational weight gain, or on the distribution of the risk variable, such as the 10th percentile, or a selected *z*-score criterion. The outcome of this task is the classification of cases into those for which the risk is present (risk factor score exceeded the risk threshold) and those for whom the risk factor is absent (risk score did not reach a predetermined risk threshold).

Identify positive deviants based on risk and health problem cross-classification. The fourth task is to identify the positive deviant cases in the dataset. This is done by first classifying all cases along two dimensions: (1) exceeding or not exceeding the threshold for the presence of a health problem (such as a weight criterion), and (2) exceeding or not exceeding the threshold for the presence of risk. Cases are then cross-classified along these two dimensions. Positive deviant cases are those for whom risk is present but who do not exhibit the health problem, that is, have a healthy outcome (see Fig. 1). A small number of cases should fall into the upper left quadrant and comprise the positive deviants in the dataset. In many field applications, the number of positive deviants who are observed is small, often ranging from four to six individuals per community (CORE, 2002, p. 86). Conversely, negative deviants—those who lack the risk factor but still have the health problem—fall into the lower right quadrant. These cases generally are not the central focus of PD. In field settings, the negatively deviant individuals are observed and interviewed to demonstrate to the community that even some individuals who are “not at risk” experience negative health outcomes.

Public health nurses should be attuned to cases that may be “false” positive deviants and exclude

		Health Problem/Outcome	
		Absent (Weight loss 3-8 weeks postpartum)	Present (Gain/no weight loss 3-8 weeks postpartum)
Risk Status	Present (Exceeded GWG guidelines)	Positive deviants	Normative pattern (for at-risk cases)
	Absent (Did not exceed GWG guidelines)	Normative pattern (for low risk cases)	Negative deviants

Note. GWG = gestational weight gain

Figure 1. Two-by-Two Table for Identifying Positive Deviants With Postpartum Weight Loss as an Example

them. For example, a new mother who loses weight because of an underlying illness rather than because of health practices is not a positive deviant. In the case of child malnutrition, children who scavenge are considered to be false positive deviant cases and excluded from analysis.

In our PD analysis of existing postpartum weight data, we found that the mean weight change from 3 to 8 weeks postpartum was a gain of 0.58 kg ($SD = 2.03$, range = -3.31 to $+3.99$), with a weekly average weight change of $+0.12$ kg. This weekly average was in the opposite direction of the weight losses of -0.17 kg/week found by Schauberger et al. (1992). Using the risk factor of excessive gestational weight gain, a cross-classification of risk and weight change similar to Figure 1 identified 6 of 26 women as positive deviants who, despite high gestational gains, lost weight between 3 and 8 weeks: 3 European American, 1 African American, and 2 Hispanic women.

Step C. Identify positive deviants' characteristics and interpret findings

To provide some logical ordering to the analysis of the characteristics of positive deviant cases, it is advisable that some conceptual work be conducted before data analysis. Thus, public health nurses should extend their work carried out in Step B related to the situational analysis by stating hypotheses and developing a preliminary model of immediate (e.g., behaviors such as fruit and vegetable intake), intermediate (e.g., attitudes toward weight), and distant (e.g., background factors such as stress) determinants of the health problem.

One should examine all of the behaviors, attitudes, beliefs, and background variables relevant to the health problem for level of measurement, for example, nominal or continuous, and sort variables by type to aid in selecting appropriate analyses. Statistical tests facilitate identifying practices that differentiate positive deviants from others. However, because the number of positive deviants is likely to be small, differences in means or relative frequencies for certain behaviors may be noteworthy, but may not reach statistical significance. Also, not every positive deviant may share every characteristic. The goal is to achieve a composite that typifies positive deviants.

In using PD with existing datasets, it is helpful to develop tables that demonstrate a comparison of positive deviants' behaviors to those of at-risk non-positive deviants. In addition, arranging variables in a logical sequence consistent with any preliminary conceptual model of determinants of the health problem facilitates data analysis. For example, a summary table could be organized to show a comparison of positive deviants versus at-risk non-positive deviants on behavioral, attitudinal, and contextual determinants of the health outcome.

In our small illustrative dataset, we elected to compare positive deviants with all others in the final analysis because we determined that combining them, regardless of risk status, did not materially affect the findings. Statistical and descriptive analyses revealed the following examples of behavioral practices that distinguished positive deviants from others: eating more vegetables, skipping junk food, not ignoring weight, eating less at meals, avoiding high-fat foods, and exercising. Positive deviants were also more likely

to have unfavorable attitudes toward their postpartum bodies, especially at 4 weeks. Contextual factors showed that positive deviants were generally under less stress than others and did not eat more in response to depressive feelings.

When PD is implemented in field applications, it allows community members guided by health volunteers and government staff to discover the unusual practices that contribute to healthy outcomes. Thus, the group or community is involved throughout the process. Because this linkage is not present when existing or archival data are analyzed, seeking consultation with representatives from the group of interest in data interpretation has great merit. One means to do this is to establish an Advisory Committee of persons from the group of interest to aid public health nurses in correctly interpreting findings within the context of daily life in the group or community. Continued participation by this committee can also strengthen the design of subsequent interventions for the group of interest.

Conclusion

Analyzing existing datasets using a PD approach provides an additional tool for addressing health disparities in specific groups and communities served by public health nurses. A strength of PD is discovery of local knowledge based on positive deviant practices, which in turn serve as a starting point for intervention design. Thus, PD is consistent with an assets approach to public health interventions (Sharpe, Greaney, Lee, & Royce, 2000). In addition to our illustration of applying a PD approach to postpartum weight retention, other possible applications include childhood and adolescent obesity and breastfeeding promotion (Centers for Disease Control and Prevention, 2006; Miech et al., 2006; Neumark-Sztainer, Story, Hannan, & Croll, 2002). Finally, because our three-step protocol is in its infancy, it is unclear whether it will lead to the same degree of intervention effectiveness that is associated with traditional field applications of PD. Findings from future research will aid in clarifying this issue.

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These are included on the Web site.

References

- Centers for Disease Control and Prevention. (2006). Racial and socioeconomic disparities in breastfeeding—United States, 2004. *Morbidity and Mortality Weekly Report*, 55(12), 335–339.
- CORE Group (Nutrition Working Group, Child Survival Collaborations, and Resources Group). (2002). *Positive deviance/hearth: A resource guide for sustainably rehabilitating malnourished children*. Washington, DC: Author.
- Institute of Medicine [IOM]. (1990). *Nutrition during pregnancy*. Washington, DC: National Academy Press.
- Mackintosh, U. A. T., Marsh, D. R., & Schroeder, D. G. (2002). Sustained positive deviant child care practices and their effects on child growth in Viet Nam. *Food and Nutrition Bulletin*, 23(4, Suppl.), 16–25.
- Marsh, D. R., Schroeder, D. G., Dearden, K. A., Sternin, J., & Sternin, M. (2004). The power of positive deviance. *British Medical Journal*, 329(7475), 1177–1179.
- Miech, R. A., Kumanyika, S. K., Stettler, N., Link, B. G., Phelan, J. C., & Chang, V. W. (2006). Trends in the association of poverty with overweight among US adolescents, 1971–2004. *Journal of the American Medical Association*, 295(20), 2385–2393.
- Neumark-Sztainer, D., Story, M., Hannan, P. J., & Croll, J. (2002). Overweight status and eating patterns among adolescents: Where do youths stand in comparison with the Healthy People 2010 Objectives? *American Journal of Public Health*, 92(5), 844–851.
- Schauberger, C. W., Rooney, B. L., & Brimer, L. M. (1992). Factors that influence weight loss in the puerperium. *Obstetrics and Gynecology*, 79(3), 424–429.
- Schieve, L. A., Cogswell, M. E., & Scanlon, K. S. (1998). Trends in pregnancy weight gain within and outside ranges recommended by the Institute of Medicine in a WIC population. *Maternal and Child Health Journal*, 2(2), 111–116.
- Sharpe, P. A., Greaney, M. L., Lee, P. R., & Royce, S. W. (2000). Assets-oriented community assessment. *Public Health Reports*, 115(2–3), 205–211.
- Walker, L. O., Timmerman, G. M., Sterling, B. S., Kim, M., & Dickson, P. (2004). Do low-income women attain their pre-pregnant weight by the 6th week of postpartum? *Ethnicity and Disease*, 14(1), 119–126.