Columbia University
MAILMAN SCHOOL
OF PUBLIC HEALTH

R^2 Specific Aims Development Panel
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Basic Points about Specific Aims:

- Consider your aims "the most critical part" of your grant.

-Don't make the reviewer work. Your specific aims must be clear, tell a simple, linear story, and lay out the grant that will follow.

-Think of specific aims as a "sales pitch." If you have any interesting collaborators, study populations, etc., include this information in your specific aims.

-Explain the public health significance of your project in the Specific Aims.

-Remember that your reviewers might not be well-versed on your topic: avoid jargon and

-Clearly define your population and lay out your proposed project (methods, etc.).

-Refer back to your Specific aims throughout your proposal, and relate your background and significance section directly to them.

-Don't be over-ambitious or unrealistic in your aims.

-Providing sub-aims or bolding important words or points can be a useful way of organizing the aims and of drawing attention to your key points.

-Identify your own weaknesses and vulnerabilities and address them.

-Check your spelling and grammar!

-Focus on being clear and concise. Take out any superfluous words, including repetition.

-Break down long sentences. Try reading your writing out loud. Leave white space in your text.

SAMPLE 1:

Title: Smoking cessation for caregivers of pediatric asthma patients: Reducing disparities in smoking and asthma morbidity in the South Bronx

Childhood asthma is the most common cause of missed school days and health care use among youth in the United States. In recent years, there is increased interest in disparities in asthma and the disproportionate burden of asthma morbidity among disadvantaged populations of minority youth especially in the inner-city. One of the most well-documented and modifiable asthma triggers is environmental tobacco smoke (ETS), and primary caregiver smoking is the most common source of ETS exposure for children with asthma. Yet, only three studies have directly addressed cigarette smoking among primary caregivers of children with asthma.

This proposal addresses this gap in public health by testing a well-developed smoking cessation intervention, the Precaution Adoption Model (PAM; feedback on the caregiver's carbon monoxide level and child's ETS exposure using Motivational Interviewing) in a real world setting of an asthma clinic in the South Bronx, an area with among the highest rates of pediatric asthma and adult smoking in the country. We will randomize XX caregivers into PAM and XX caregivers into the Behavioral Action Model (BAM), a comparison intervention modeled on standard clinical guidelines for smoking cessation. This will provide sufficient power to detect differences in outcomes between interventions. Preliminary data suggest that there is a high level of need for this intervention, and that it could be effective, in this population.

A multilevel approach is likely to be required for effective reduction of cigarette smoking and asthma morbidity, but if successful, PAM offered to caregivers in pediatric asthma care settings may be one key, practical method of reducing *both* smoking among adults and asthma morbidity among children. Hence, the four Specific Aims of the study are:

1. To determine the impact of a 3-month PAM, compared with BAM, for primary caregivers of pediatric patients with asthma on self-reported caregiver smoking rates verified by biological indices, measured by point-prevalence abstinence at 2, 4, 8, 16, 24, and 52 weeks after the intervention.

2. To determine the impact of PAM, compared with BAM, with primary caregivers on exposure to environmental tobacco smoke, as measured by biological indices, among pediatric patients with asthma in the South Bronx.

3. To determine the impact of PAM, compared with BAM, with primary caregivers on asthma morbidity among pediatric asthma patients in the South Bronx. Asthma morbidity will be measured by number of symptom free days averaged over the peak asthma season (November- February).

4. To determine the impact of PAM, compared with BAM, with primary caregivers on health service among pediatric asthma patients in the South Bronx. Health service use among pediatric asthma patients to be measured using a summary index that includes emergency department use, hospitalization and physician visits.

PANELIST COMMENTS, SAMPLE 1:

Title: Make sure it's not too long and that it accurately reflects project. Shorten sentences, and take out superfluous words and phrases (example: first sentence of second paragraph). Randomization does not lead to power (second paragraph). Specific aims: no need to repeat "To determine the impact of PAM, compared with BAM" in each aim, unnecessary words, and makes it difficult to tell the differentiate between each aim. There are definite positive points in this sample though, including drawing attention to the public health significance.

SAMPLE 2:

Specific Aims

The proposed sub-study seeks to explain black-white disparities in perinatal outcomes, i.e. infant birth weight, by examining the influences of individual, household and neighborhood socioeconomic position across four time points at birth, childhood, adolescence, and adulthood (or time of the birth of parents' offspring). Infant birth weight is considered a marker for early adult health under both the parent grant and proposed sub-study. This project has the following specific aims:

Aim #1. To examine independent effects of parents' multidimensional socioeconomic position at parents' birth, at parents' childhood, at parents' adolescence, and at parents' adulthood on the infant birth weights of parents' offspring.

Aim #2. To identify differential trajectories of multidimensional socioeconomic position across parents' lifecourse that may account for racial disparities in infant birth weight.

Aim #3. To evaluate empirically whether and to what extent a model of dynamic interplay, the mutual influence of social conditions and emerging health across the lifecourse, can account for black-white disparities in infant birth weight.

PANELIST COMMENTS, SAMPLE 2:

Be clear and specific (for example, if birth weight is being measured, simply say "birth weight" instead of "perinatal outcomes, i.e. infant birth weight). Break up long sentences.

SAMPLE 3:

To compare accessibility, immunization practices, and beliefs of pediatric and adolescent health care providers and explore how these factors impact adolescent girls in their initiation and completion of the 3-dose HPV vaccine series.

PANELIST COMMENTS, SAMPLE 3:

Very unclear as to what the study consists of. Needs filling out/ development. Interesting and important topic.

SAMPLE 4:

Based on qualitative interviews, we will examine the following **specific aims**-from the perspectives of the *target population, community partners, and academicians*:

1. To document the facilitators and barriers that might influence young men who have been incarcerated to participate in HIV/AIDS prevention programs
2. To examine confirm and find additional HIV prevention needs of young men who have been incarcerated
3. To develop working engagement guidelines for the process of successful HIV intervention development research.

PANELIST COMMENTS, SAMPLE 4:

What is the public health problem? What is the target population? Who are the community partners? Be careful of using quantitative language to describe qualitative work (example: “confirm”). The word “explore” can be used if the level of knowledge of the subject is extremely low, but might be inappropriate in other instances.

SAMPLE 5:

A. Specific Aims

This project seeks to develop an individual-based model of social behavior that is directly relevant to health behaviors. In doing so, it will provide a comprehensive account of how social dynamics impact individuals' health and will lend insight into the social mechanisms that generate health disparities.

To this end, we propose a theoretical framework that provides a non-trivial treatment of both the individual and social determinants of health, and importantly, how these two levels of organization interact. Our formulation breaks down health behavior into two constructs: social and psychological. The psychological construct is meant to represent an individual's behavior, a product of mental, biological & genetic factors. The social construct represents any input to the psychological system to include structural factors and interactions with other individuals.

The proposed framework implements the psychological process as a computational model using artificial neural networks. This is a well-proven method for representing the psychological processes, such as learning and representation, that are implicated in health behaviors. The social construct is represented by the inputs to the neural network system. Furthermore, by allowing the inputs of the neural network to represent the behavior of others, the framework can capture the dynamics of social interaction. In short, we will simulate the individual and social mechanisms that underlie health behaviors.

We propose that disparate patterns of health behavior can be explained using an individual-based theory of social behavior that is implemented as a computational model. It is essential for the success of the proposed work, therefore, to evaluate whether the proposed modeling efforts can replicate the existing empirical patterns of data.

The long-term goal of the proposed work is to provide the research community with a way to simulate how specific target populations will respond to population health intervention and prevention efforts, in addition to providing theoretical explanations of health behaviors. Therefore, it is imperative to produce, as a product of this work, a standard terminology and methodology that can be used across health behaviors and for future efforts of a similar nature.

The specific aims are as follows:

Specific Aim #1. To transform individual-based psychological theories of health behavior into computational models implemented as neural networks.

Specific Aim #2. To embed the individual-based computational model into social theory, thus representing the related structural and social processes in a naturalistic way.

Specific Aim #3. To evaluate empirically the performance of our computational model in comparison to existing empirically-based psychological and epidemiological data

Specific Aim #4. To provide a framework for simulating key scenarios applied to intervention and prevention efforts to include a generalized nomenclature and language for future efforts.

PANELIST COMMENTS, SAMPLE 5:

Dense writing, shorten long sentences. Make sure not to use jargon. With the specific aims, no need to repeat "To" in each aim. Instead, say "The specific aims are to:" and then begin each aim with a verb. Specific Aim #4 appears overly ambitious.

SAMPLE 6:

A. Specific Aims

Echocardiographic left ventricular hypertrophy (LVH), as defined by increased left ventricular mass (LVM), is a powerful and independent predictor of cardiovascular disease (CVD) morbidity and mortality as has been shown in non-Hispanic blacks and whites.[1-4] Information regarding the prevalence and determinants of LVH among Hispanics, who represent the largest and fastest growing minority ethnic group in the US, is very limited and poorly defined**.** Prior studies have used estimates from one Hispanic subgroup to represent all Hispanics when this may not appropriate. Hispanic subgroups share varying proportions of West African, Native American and European ancestry,[5] with characteristic differences in culture, geographic history, and US inclusion experience that impacts their cardiac risk. Recent data suggest that Caribbean-Hispanics (defined as Cubans, Puerto Ricans, and Dominicans) have a higher prevalence of hypertension, LVH and abnormal LV geometry compared to non-Hispanic whites, but a higher prevalence of LVH was also observed among Mexican-Americans despite a lower prevalence of hypertension.[6]

Heart failure (HF) prevalence has been increasing over the past 30 years. Echocardiography is often performed in HF patients to determine if systolic function is reduced or if diastolic dysfunction is present. The prevalence rates of asymptomatic systolic and diastolic dysfunction in the general population are not insignificant (~7-14% and 20-30% respectively).[7, 8] However, these studies did not include any Hispanics, which is particularly relevant because Hispanics are not only more likely to be hypertensive and to have diabetes than non-Hispanic whites, they are also more likely to be have LVH and abnormal LV geometry compared to whites.[6] These differences in cardiac structure among Hispanics could influence the incidence of clinical and preclinical systolic and diastolic dysfunction. **No study has characterized the prevalence and explored the determinants of systolic and diastolic HF in a Hispanic community cohort.**

The Hispanic Communities Health Study – Study of Latinos (HCHS-SOL) is a four-year, NHLBI-funded prospective cohort study of 16,000 Hispanic subjects. This study uses a unique sampling design that ensures enrollment from each distinct Hispanic subgroup, and has collected a vast array of clinical, psychosocial, and socioeconomic data. The HCHS-SOL represents a unique opportunity to efficiently study the prevalence and determinants of cardiac structure and function in Hispanics in a highly cost-effective manner. We will recruit 1800 randomly selected participants drawn from the population-based study sample of Hispanics across four sites (Bronx, NY; Chicago; San Diego; Miami) and perform echocardiograms on each participant. The proposed investigation will provide important insight and understanding into the prevalence and determinants of echocardiographic LVM as well as **systolic and diastolic function** among Hispanics as well as potential differences that may exist among the subgroups.

The proposal has three specific aims:

Aim 1) Determine the prevalence and determinants of cardiac structure among Hispanics. We will look at the total Hispanic cohort to determine the distribution of **LV mass, LV remodeling, and prevalent LVH. As a secondary analysis we will** test the hypothesis that there are between-group differences in echo-LVM parameters among Hispanic subgroups that are only partially explained by differences in known risk factors for LVH such as blood pressure level, diabetic status and body habitus.

Aim 2) To characterize the prevalence of systolic and diastolic HF in an Hispanic community cohort and explore determinants (risk factors).

Recent data[9] suggest that the consequences and burden of HF are magnified among the Hispanic population. Using rigorous echocardiographic techniques not employed in prior population-based studies (tissue Doppler imaging, pulmonary vein flow, left atrial size, and strain imaging analysis), our study will describe the prevalence and determinants of systolic and diastolic dysfunction in an unselected population of Hispanics.

Aim 3) To establish the potential contributions of psychosocial, behavioral, and socioeconomic factors to explaining the prevalence of LVH and systolic/diastolic dysfunction among Hispanics.

Psychosocial and socioeconomic factors have not been well studied among Hispanics particularly in relation to cardiac structure and function. We hypothesize that more acculturation will be associated with more LVM; less familism with more LVM. We hypothesize that lower socioeconomic status will be associated with worse systolic and diastolic function while stress buffering factors such as social support will predict better cardiac function. We will examine these hypotheses in the total cohort of Hispanics for the primary analysis and then within Hispanic subgroups for secondary analysis.

PANELIST COMMENTS, SAMPLE 6:

Aims can be over 1 page. Watch for sentences that are too long, and avoid adjectives. This sample is “not bad” but is slightly wordy. Be careful of saying “no study has addressed this.” Using “understudied” is better. The use of bolding is good. Don’t discuss “recent data” in the aims, and don’t include superfluous information (“Hispanics, who represent the largest and fastest growing minority ethnic group in the US…”).