Infectious Diseases Nutrition
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Positive Communication

A Quarterly Newsletter of the Infectious Diseases Nutrition Dietetic Practice Group

Emerging Models for HIV Nutrition Care

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Introduction

The way we treat Human Immunodeficiency Virus (HIV) has changed over the past decade. Common causes of death among people living with HIV/AIDS (PLWHA) have shifted from opportunistic infections to complications caused by liver disease and renal dysfunction, prompting a need for updated models of care in this population (1). Prevalence of hypertension, cardiovascular disease (CVD), and diabetes has greatly increased. Dietetics professionals can do much to help this population, but our original treatment strategies must shift to meet changing needs. Dietetics professionals working with PLWHA have an understanding of the effects of antiretroviral medications, how to address gastrointestinal complications and HIV-related wasting, and how to counteract malnutrition; however, a new set of skills has become necessary as new challenges have come into focus.

Cardiovascular Disease

CVD is the leading cause of death for both men and women in the United States. Its increased prevalence among PLWHA is not surprising, given the increased average life expectancy in this population. Not only do PLWHA have higher rates of CVD than in the past, they also have higher rates compared to HIV negative individuals. The effects of HIV itself (such as chronic inflammation and endothelial dysfunction), the side effects antiretroviral medications (such as lipid abnormalities and insulin resistance), and traditional risk-factors (such as family history and smoking) all play a role in the development of CVD among PLWHA. Risk factors can be addressed through a combination of medical management and lifestyle modification. More research is needed on the efficacy of specific nutrition and lifestyle interventions among PLWHA. >>>

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Liver Disease

Liver disease-related morbidity and mortality have increased considerably among PLWHA when compared with the pre-HAART era. Chronic viral hepatitis is the leading cause of liver disease-related deaths among PLWHA; however, drug-induced hepatotoxicity and the effects of HIV itself may also play a role in liver dysfunction. While the presence of HIV can lead to more rapid progression of liver damage compared to hepatitis C virus (HCV) mono-infection, the effect of HCV on HIV disease progression is not fully understood. Medical Nutrition Therapy (MNT) for liver disease is well documented. Nutrition intervention may be particularly important for patients undergoing treatment for HCV. Dietetics professionals working with PLWHA may be especially interested in potential links between liver dysfunction and HIV-related microbial translocation, bone metabolism, CVD, and specific nutrient deficiencies.

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Renal Dysfunction

Chronic kidney disease (CKD) is also an emerging cause of morbidity and mortality among PLWHA. This may be related to increased life expectancy, the nephrotoxic effects of some antiretroviral therapies, and the presence of HIV itself. Other risk factors include hypertension, diabetes mellitus, and HCV co-infection. Given the risk factors present in many PLWHA, dietetics professionals can play an important role in monitoring renal function and addressing comorbidities that can lead to or exacerbate nephropathy. Consistent with established MNT guidelines for CKD, intervention may include counseling on a low sodium diet, and, if warranted, education on appropriate restriction of protein, potassium and/or phosphorous intake.

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Continued Importance of Dietetics Professionals

According to Chu and colleagues, research suggests less comfort treating comorbidities such as hyperlipidemia, diabetes, and hypertension among HIV primary care providers compared to their generalist counterparts (1). This points to an important role that dietetics professionals must play as part of a coordinated treatment team. With skillful knowledge of HIV related comorbidities, we can continue to provide long-term nutritional assessment and intervention throughout the lifecycle with a focus on preventative nutrition to help slow disease progression and improve health outcomes.

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Chair Letter

I hope this finds you doing well both professionally and personally in 2013. Here in New York City, spring has arrived and the blossoming flowers and reemergence of leaves always remind me of new beginnings. Fresh starts. Our DPG finds itself in a similar position. Beginning in June, we will be a sub-unit of the Medical Nutrition Practice Group (MNPG). It is a new beginning for us and I hope you will join me in supporting this transition.

Before discussing our future, I would like to reflect on our past. I have been in contact with past chairs and leaders of our group and I would like to share some thoughts they expressed to me. Our first year as a DPG was in 1997 when the treatment of HIV/AIDS was changing. In 2006, the DPG, but especially Deane Edelman, our Public Policy Chair at the time, played an important role in getting Medical Nutrition Therapy recognized as a core service within the Ryan White HIV/AIDS Treatment Modernization Act. We also developed a booklet for people living with HIV/AIDS called Appetite for Life. Many past chairs reminisced about previous board meetings held in Arizona, a mansion in Baltimore, a hotel in Orlando, and a house on Lake Travis. There were also memorable receptions in St. Louis and Anaheim. Jennifer Eliasi, MS, RD, CDN, AMR was the only Chair to hold the position twice. Her first time as Chair she organized a very successful session at FNCE about HIV/HCV co infection that more than 300 people attended. We also were involved with creating our own tracks of sessions at the annual ANSA Conferences. We recently revamped our website, which Alan Lee led when he was Chair. It is difficult to sum up all the successes we have experienced in our 16 years but I would like to thank all our past leaders for the great work that was accomplished. You were true pioneers and we will forever be grateful.

Now, I would like to take this opportunity to inform you of what the DPG has been doing to prepare for our merge to the Medical Nutrition Practice Group (MNPG) as a sub-unit for the 2013-2014 fiscal year. In October, three executive board members attended FNCE. We supported our DPG at our booth at the membership showcase on Monday. We also met with the Academy and MNPG to begin discussing a transition to becoming a sub-unit. The three of us felt very supported and knew the best interest of our DPG was being considered. Since FNCE and the decisive vote to become a sub-unit, we have been involved with monthly MNPG board & sub-unit sub-committee meetings. It has been a pleasure getting to know their executive board—Keiy has a great group of people to work with next fiscal year.

Sarah also submitted a 2013-2014 sub-unit Project of Work that was approved by the MNPG and the Academy. Lastly, our editors have been publishing our final newsletters and Lisa has been representing us as a delegate.

Moving forward as a sub-unit, we will have access to continuing education credits through peer-reviewed quarterly newsletters and webinars—something members and previous members expressed much interest in. Our sub-unit will contribute a quarterly article to the MNPG newsletter. We also plan to organize one webinar per fiscal year. In addition, we will continue a sub-unit EML dedicated to infectious diseases and our current website will be transitioned over to the MNPG website in its own section.

The past few years we have seen a huge decline in sponsorships with our DPG. We hope that being a sub-unit of MNPG will open more doors and we will find sponsorships that may be able to support sub-unit FNCE events. In addition, our mission will not change. We will continue to network and share information, collaborate, and advocate in order to positively impact people affected with infectious diseases. We hope that members of MNPG and other DPGs will seek us out and we will be able to educate more dietitians about the important work we all do every day.

I would like to take this opportunity to thank the 2012-2013 IDN DPG Executive Board and Committee members. Although this year was different to ones in the past and your responsibilities may not have been what you expected, I do appreciate your time, feedback and participation.

So thank you to the following members:
Chair Elect
Keiy Murofushi, MS, RD
Past Chair
Jenny Torino, MS, RD
Secretary
Ben Atkinson, MS, RD , CD
Treasurer
Sarah Robertson, RD, CDN
Newsletter Editors
Naima Sullivan, MS, RD & Lillian Pinault, MS, RD
Membership Alliance Chairs
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Web Manager
Alan Lee, RD, CDE, CDN, CFT
EML Subscription Coordinator
Heather Southwell Freasier, MS, RD
IDN DPG Manager
Mya Wilson, MPH, MBA

Lastly, as we move forward we welcome feedback and participation from you. We need to continue to be active and vocal about our role with infectious diseases. This may be a new beginning for us but we are still fighting an old fight. I encourage you to stay or become more involved. If you are interested in contributing to a newsletter article, organizing a webinar, or would like to become involved in a committee to support Keiy next year, please let him know by emailing him at **nutritionk@gmail.com.**

Thank you for your patience this past year. I look forward to continuing this journey with you in June. Be well.
Linnea Matulat, MS, RD, CDN

Letter from the Editors

As we send out this final issue of Positive Communication, we would like to express our respect and admiration for the IDN DPG membership. We are dietetics professionals working in the care of people living with HIV and other infectious diseases. We have made many great strides in improving the lives of our patients, clients, and communities and we have been vocal and dedicated advocates for our profession and specialty. In the final weeks of the current AND membership year, I am looking forward to the many opportunities that will come from our partnership with the Medical Nutrition Practice Group. This is an exciting beginning, not an end.

For this issue Linnea Matulat and Cynthia Kupper, outgoing Chairs of the IDN and MNPG DPGs, have written to let you know what you can expect as members of the MNPG and the IDN sub-unit. Thanks to Shabnam Greenfield, MS, RD and the editors of the GNYDA newsletter, the Greater New Yorker, we have been able to reprint a summary from the recent Nutritionists in AIDS Care annual meeting held in New York City in April. Jennifer Rock, a Teachers College, Columbia University Dietetic Intern has provided us with some ideas for establishing new standards of care for people living with HIV/AIDS, in light of the now chronic nature of HIV, the aging HIV population, and the increasing prevalence of comorbidities. Finally we have included some infectious disease research briefs which you may find of interest.

We would also like to take this opportunity to invite you all to become involved with the new IDN sub-unit. Anyone interested in contributing infectious disease-focused content to the MNPG newsletter, participating in webinars or other continuing education activities, or helping with the IDN sub-unit activities at FNCE 2013 should reach out directly to Keiy Murofushi (nutritionk@gmail.com), the incoming Chair of the IDN sub-unit. We know that there are many of you with knowledge and skills to share. All of us, and the members of the MNPG DPG, will benefit from your participation.

Although it has been a challenging year, we have both been pleased with the opportunity to meet, collaborate with, and learn from so many of our colleagues. I know that with the same energy and enthusiasm about the work we do, we can continue to have great and lasting impact.

Thank you,
Naima Sullivan, MS, RD, CDN
Lillian Pinault, MS, RD, CDE

Welcome to the Medical Nutrition Practice Group

I am excited to welcome the members of the Infectious Diseases Nutrition Dietetic Practice Group (IDN) to the Medical Nutrition Practice Group (MNPG), as a sub-unit. The MNPG has two other specialty sub-units. Several years ago, when I wanted to form a DPG for Dietitians in Gluten Intolerance Diseases (DIGID), I realized I wasn't sure if we could get enough members to have an independent DPG. I met with the leaders of the MNPG in St. Louis, MO and presented my case for becoming a sub-unit of the MNPG. DIGID would become the first sub-unit of the Medical Nutrition Practice Group. I have never regretted that decision.

MNPG offers our sub-units, DIGID and Dietitians in Physical Medicine and Rehabilitation (DPM&R), the ability to thrive in their specialty while enjoying the support of a larger support team. At the same time, the sub-units enjoy the exposure to a larger audience and help to round out the special information MNPG can provide to dietitians.

MNPG focuses on supporting the general dietitian, often working in smaller health care facilities, who are expected to know a little about so many issues. I look forward to the valuable information the IDN can add to round out the knowledge of these dietitians.

MNPG offers many of the same education opportunities that IDN already enjoys – webinars, special articles for infectious diseases in the MNPG newsletter, as well as the ability to continue a newsletter specifically for this specialty group. IDN will maintain its name and have a special section of MNPGDPG.org, where the current information found on the IDN website is being transfered. There is the opportunity to have a listserv specifically for persons interested in infectious diseases. MNPG is planning a special FNCE event that will highlight all the specialty sub-units. MNPG will be tracking interest and members of the IDN in order to help focus information to this group.

I strongly encourage you to get involved in the IDN through MNPG membership. When you are a member of the MNPG, you can sign up for any or all of the specialty sub-units without additional costs. Getting involved within the sub-unit is rewarding. Everyone can play a valuable role in the sub-unit. If you would like to broaden your horizons, consider volunteering for the MNPG as a committee member, article contributor, program planner, reviewer, webinar educator, leader, etc. Don't worry if you are a busy person, there is still a way to be involved in the DPG and IDN sub-unit. I am a very busy person, but I have loved my leadership roles in the Academy, MNPG, and especially the DIGID sub-unit. I have learned a lot about the Academy and its processes. That knowledge has allowed me to become a better dietitian. The leaders in the MNPG are supportive and helpful; they are a terrific team, and looking forward to IDN leaders joining this team.

I know this move is the right move for IDN. Please join the MNPG DPG and continue to receive the valuable resources that the IDN provides.

I look forward to meeting all of you. Welcome to the Medical Nutrition Practice Group's newest specialty sub-unit: (Dietitians in) Infectious Diseases Nutrition.

Cynthia Kupper, RD is the outgoing Medical Nutrition Practice Group (MNPG) DPG Chair. She is the executive Director of the Gluten Intolerance Group (GIG), a 38 year old organization, and worked as a clinical dietitian for 15 years before joining the GIG.

NIAC Conference 2013

Updates and Innovations in HIV/AIDS Care

On April 13, 2013, GNYDA's Nutritionists in AIDS Care (NIAC) special interest group hosted their annual conference, titled "Updates, Challenges and Treatments in HIV Disease" at The LGBT Community Center in the West Village. The event kicked off with a welcome address by GNYDA President Tomoko Okada, MS, RD, CNSC, CDN and NIAC co-chairs Julie Granoff, RD, CDN and Lisa Ronco, MS, RD, CDN.

The day's first speaker was Dr Rona Vail, Internal Medicine Specialist at Callen-Lorde Health Center, a medical facility that serves the LGBT and HIV/AIDS communities. Dr Vail, who stepped down from her position as Callen Lorde's Medical Director so that she could concentrate on HIV patient care, provided an update on current HIV treatment options and guidelines as well as an overview of this year's recent Conference on Retroviruses and Opportunistic Infections (CROI). She began by reviewing updated protocols for initiating anti-retroviral (ARV) treatment which now emphasize starting treatment as early as possible (given the patient's ability to commit), even for those with higher CD4 counts (>500 cells/ul). She reviewed the various medication regimens, highlighting two new ARVs on the market—Complera and Stribild—both one-a-day pills that have proven popular with patients. Both meds are to be taken with food, although Complera requires 400 kcals of solid food for proper absorption. Her update from CROI 2013 pointed to new drugs in the HIV and Hepatitis C pipeline that may be better tolerated by patients as well as current obesity stats in the HIV population. Prevalence for obesity recently peaked at 23% (vs 36% in the general population) for all people living with HIV/AIDS (PLWHA), and at 44.7% for HIV+ women aged 20-39—a striking example of the changing face of the disease and how our role as nutrition practitioners in this population must change with it.

Next up was Dr Stephen Karpiak, Senior Director for Research and Evaluation at the AIDS Community Research Initiative of America, where he spearheaded the Research on Older Adults with HIV (ROAH) study. He opened his talk, titled "HIV and Aging: The Challenge of Multi-Morbidities," with the dramatic statistic that by 2015, 50% of PLWHA in the US will be age 50 or older. He explained that this "graying of the HIV epidemic" is largely due to effective treatments that have kept people alive longer (although their life expectancy is still, at best, 14% shorter than the general population), but also noted that a secondary cause is older adults who are infected with the virus after the age of 50 (often via unprotected sex with their peers). The multiple challenges faced by an aging HIV population were made evident in the information presented from ROAH which found that of 1000 PLWHA aged 50+ in New York City, the average participant was 55 years old and living with 3.3 comorbidities, compared to the average older adult in the general population who is 70+ and living with 1.1 comorbid conditions. >>>

By far the most common co-morbidity for the ROAH participants was depression (>50%), followed by arthritis, hepatitis and neuropathy. Other health conditions with a higher prevalence in this population include: CVD, cancer, and bone fractures/ osteopenia. These heightened risks are related not only to the virus, but also to ARVs and lifestyle factors (poor diet, physical inactivity, and high smoking rates) common in PLWHAs. Dr Karpiak placed special emphasis on the need to manage the widespread problem of depression (which is the main cause of medication non-compliance) via drugs, therapy and increased socialization.

After a networking lunch, New York Presbyterian's Comprehensive HIV Program Medical Director, Dr Peter Gordon, presented on "Chronic Immune Activation in HIV: Metabolic and Disease Specific Implications." He set out by echoing Dr Karpiak on the premature occurrence and increased number of comorbidities in PLWHAs. The causes for this, he explained, are multifactorial, however, one culprit that is a lesser known consequence of HIV infection is the state of chronic immune activation that exists even for those on HAART with undetectable viral loads and high CD4 counts. In the first few weeks of HIV infection, the main site of attack is the small intestine. Here, the virus kills off the bulk of T cells, causing the tight junctions in the lining of the gut to become porous to microbial products that leak across the lining into the blood stream triggering an immune response. Despite early HAART initiation, these gaps in the tight junctions remain. With this constant immune activation comes a constant stream of cytokines that maintain a low level of chronic inflammation (subsequently increasing risk for inflammatory conditions such as CVD and diabetes) and also paradoxically decrease energy expenditure. As a side note, this cascade of events is much the same as that which occurs in obese individuals (who are also at increased risk for many of the same comorbidities) and may be a contributing factor to the increasing rate of obesity in PLWHAs. Of most interest to the RDs in the room, however, was the link Dr Gordon drew between diet and an individual's level of immune activation via its effect on the gut's microbiome. While we don't yet know what balance of microbes would best promote a "quieting" of the immune response, nor do we necessarily know what dietary components would support this specific microbiome, it does present those of us in the field with an exciting new role for diet as an adjunctive therapy in treating the HIV/AIDS population.

The final presentation of the day was by Dr Anita Radix, Director of Research and Education and Internist/ HIV specialist at Callen Lorde, who spoke about "HIV Treatment & Care for Transgender Individuals." In the U.S., 1 in 8 transgendered individuals is HIV+, and among African-American transwomen (male-to-female) the rates are as high as 50-60%. Dr Radix began her talk by reviewing the terms used to describe gender in this population (encouraging practitioners to ask the individual if they prefer to be called "he" or "she") as well as the various surgeries and hormone therapies that are commonly used. Transwomen are typically given estrogen in combination with an anti-androgen. Of relevance to those us involved in these individuals' nutrition care is the increased risk for weight gain, gallstones, hypertriglyceridemia and CVD while taking these hormones. Transmen (female-to-male) are given testosterone, which increases their risk for weight gain, acne and sleep apnea. Most healthcare workers are not trained in delivering care to the transgender community and therefore many transgendered individuals have had negative healthcare experiences. Given the high prevalence of HIV in this community and the large number of psychosocial challenges they face, it is of paramount importance that, as members of the healthcare team, we approach their care with openness and sensitivity to their unique needs.

Overall, this outstanding roster of speakers provided audience members with important new information on the most pressing issues currently facing PLWHAs—information that is critical to our ability to provide high quality, comprehensive care for our patients. For us dietitians, the conference reinforced the pivotal role we play in managing the chronic health conditions of an aging HIV population that is plagued by many of the same health issues as the general population, just at earlier ages and higher rates. And as Dr Gordon's presentation made clear, new research may even be paving the way for diet to play an active role in managing the direct effects of the virus on the immune system—a reminder of the continuous innovations in research that have the potential to dramatically affect our practice.

Shabnam Greenfield, MS, RD is the Program Coordinator for Heritage Health & Housing's Food and Nutrition Services Program in New York City.

Research Briefs

HIV/AIDS

Risk of cardiovascular disease in HIV, hepatitis C, or HIV/hepatitis C patients compared to the general population. Kakinami L, Block R, Adams M, Cohn S, Maliakkal B, Fisher S. Int J Clin Pract. 2013;67(1):6-13.

Cardiovascular and other chronic diseases are of growing importance in the management of HIV positive patients as treatment for HIV itself improves. This cross-sectional study sought to compare cardiovascular risk among individuals with HIV infection, HCV infection, HIV/HCV co-infection, and the general public. The study participants were 588 clinic patients from Rochester, NY (HIV: 239, HIV/HCT: 182, HCV: 167), and 1764 uninfected controls from NHANES data were used for comparison. Data was obtained by chart review, and cardiovascular risk was evaluated using the cardiovascular disease Framingham Risk Score (FRS) and vascular age algorithm (originally described in the Framingham Heart Study cohort). After controlling for relevant variables, individuals with HIV/HCV co-infection exhibited a 2% higher FRS compared to the general population, and a vascular age difference that was 4.1 years greater. Individuals with HCV were similarly at increased risk for CVD (2.4% higher FRS and vascular age differences that were 4.4 years greater). The HIV+ group, however, showed only a non-significant elevation in CVD risk compared to the general public in this study. The authors suggested the lack of statistical difference between CVD risk in HIV+ and uninfected individuals may be a result of aggressive screening and treatment of CVD in HIV+ patients.

Prevalence and characteristics associated with malnutrition at hospitalization among patients with Acquired Immunodeficiency Syndrome (AIDS) in Brazil. PLoS ONE. 2012;7(11).

This study took place at a hospital in Brazil which provides specialized inpatient care for AIDS patients, and consisted of a cross-sectional nutrition assessment of 127 adults with AIDS. Body composition was estimated from tricipital skinfold measurements, lean mass was estimated from mid-upper arm muscle area, and demographic, socioeconomic and other clinical data was obtained by patient interview and chart review. 43% of the study population was malnourished upon admission (defined as BMI < 18.5) and 15% were severely malnourished (BMI < 16). 35% had severe weight loss (>20% weight loss, using patient's recalled weight from 6 months prior to admission). Older age and low per capita income were both independently associated with malnutrition. The only clinical diagnosis associated with malnutrition was chronic diarrhea, but this was not statistically significant. Interestingly, one third of study participants were unaware of their HIV disease prior to the current hospitalization, and the majority of those on HAART reported recent treatment interruption, suggesting that early testing and treatment adherence should both remain priorities in efforts to reduce morbidity and mortality among this patient population. This study also confirms that malnutrition and weight loss persist among hospitalized patients with AIDS, despite treatment advances.

Immunity

Clinical effects of probiotic Bifidobacterium longum BB536 on immune function and intestinal microbiota in elderly patients receiving enteral tube feeding. J Parenter Enteral Nutr. 2012. [Epub ahead of print]

Immune function is known to decline with age, and can decrease the effectiveness of vaccines, such as those for influenza. This study sought to test whether probiotic supplementation could >>>

improve various parameters of immunity in response to the influenza vaccine in elderly patients. This was a double-blind, placebo-controlled parallel-group study that took place in a Japanese hospital. The 45 study participants were at least 65 years old and receiving some form of enteral nutrition. Either a probiotic (Bifidobacterium longum BB536) or a placebo powder was added to each patient's enteral feeding for 12 weeks. At week 4, all patients received the influenza vaccine. No patients developed influenza during the study period, and no adverse effects were noted from the probiotic or placebo powders. Following the intervention period, the total number of bifidobacteria had significantly increased from baseline in the probiotic group, and was significantly higher than that of the placebo group. There was no significant inter-group difference in total immunoglobulin levels, although levels of IgA tended to be higher in the probiotic group. Natural killer cell activity declined over the intervention period in the placebo group, but not in the probiotic group. In conclusion, administration of this probiotic significantly increased the number of beneficial bifidobacteria and may have influenced immune parameters in a hospitalized elderly population. As no patients developed influenza during the study period, it was not possible to determine whether the probiotic prevents infection.

Tuberculosis

Association of diabetes and tuberculosis: impact on treatment and post-treatment outcomes. Jimenez-Corona M, Cruz-Hervert L, Garcia-Garcia L, Ferreyra-Reyes L, Delgado-Sanchez G, Bobadilla-del-Valle M, Canizales-Quintero S, Ferreira-Guerrero E, Baez-Saldana R, Tellez-Vazquez N, Montero-Campos R, Mongua-Rodriguez N, Martinez-Gamboa R, Sifuentes-Osornio J, Ponce-de-Leon A. Thorax. 2012;0:1-7.

Previous studies have suggested that tuberculosis (TB) risk may be higher among individuals with diabetes. This prospective study was conducted to compare outcomes of TB patients in Southern Mexico with and without diabetes. 1262 patients with pulmonary TB were recruited during the 15-year study period, ~30% of which also had diabetes. All patients received TB treatment according to Mexico's National TB Control Program; following treatment, annual follow-up visits continued for the duration of the study. Outcomes evaluated included severity of disease (per presence of cavities on chest x-rays), delayed sputum conversion, treatment failure, recurrence and relapse. In this study, diabetes appeared to exacerbate the clinical effects of TB: patients with both diagnoses experienced more severe TB during treatment, per chest x-rays, as well as higher probabilities of treatment failure, recurrence and relapse. As diabetes is currently a global epidemic, this study demonstrates that effective TB control must take into account diabetes prevention and treatment strategies as well.

Low nutrient intake among adult women and patients with severe tuberculosis disease in Uganda: a cross-sectional study. Mupere E, Parraga I, Tisch D, Mayanja H, Whalen C. BMC Public Health. 2012;12:1050.

Co-infection with pulmonary tuberculosis (TB) and HIV is known to cause more severe wasting than that seen with either infection by itself. Decreases in appetite and/or intake may be contributing factors. This cross-sectional study in Uganda evaluated nutrient intake via 24-hour recall of 131 participants, who were divided into four independent groups: HIV+ with or without TB, and HIV negative with or without TB. Patients who had already received TB treatment were excluded from the study. Further analysis was completed for all groups to evaluate wasting status (using BMI and lean mass index) as well as TB disease severity (using the validated clinical TB score). Average 24 hour nutrient intake did not differ significantly by TB status or by HIV status. Patients with severe TB had significantly lower intakes of energy, protein, total fat, carbohydrates, calcium, vitamin A and folate. This was true regardless of wasting status and regardless of HIV status. The authors conclude that nutrition counseling and/or supplementation at the time of tuberculosis diagnosis may improve outcomes, particularly for individuals with severe disease.