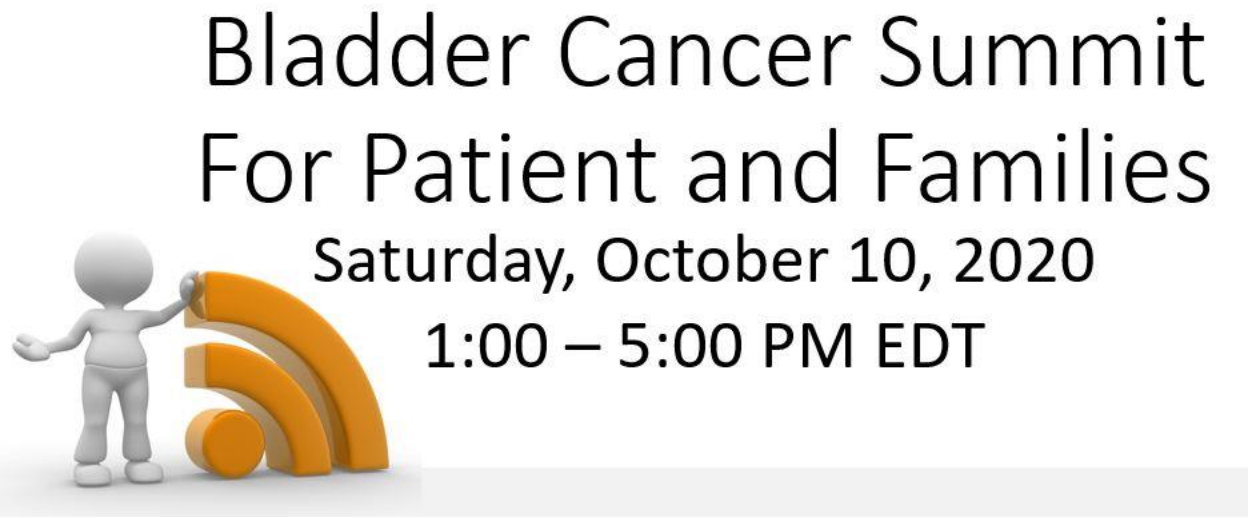


PART 3: Bladder Cancer and COVID 19 Update

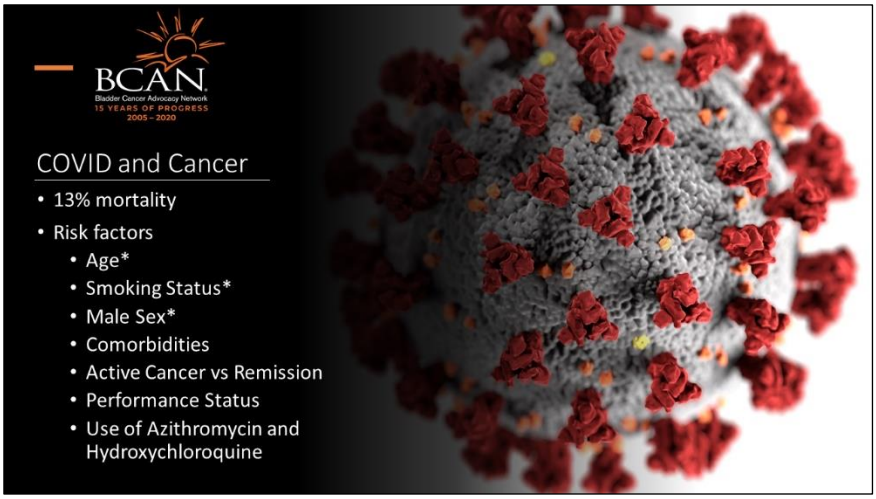
Stephanie Chisolm: Our next session is going to feature Dr. Michael Poch, who is an associate member of the Genital Urinary Oncology at Moffitt Cancer Center and medical director of Genital Urinary Oncology Clinic. So Dr. Poch, it's a pleasure to have you with us.

Dr. Michael Poch: Thank you very much. It's a pleasure to be here. Thank you, Stephanie, and Morgan, and BCAN for inviting me to have a conversation with our community about the current pandemic and its relationship to bladder cancer. So I appreciate certainly the opportunity and the invitation.

So just as a highlight, BCAN actually did some of my work for me already. If you go to their website with some frequently asked questions, there's actually a landing page for COVID-19 FAQ's which address a lot of the questions I think that patients have that I see in my own clinic regarding bladder cancer and COVID-19, as it relates to either therapies, safety of travel, chemotherapy, immunotherapy, etc. So I would highlight this, if patients have questions, you can see that the URL below can provide some information as well.

This has certainly been a challenging and tumultuous year for almost everybody on the planet. I'm going to try to cover some commonly asked questions, address some maybe favorable news, still persistent challenges that we have with the pandemic. And we'll take some questions at the end. And again, my thoughts go out to a lot of the people, the individuals and family members that have been afflicted with COVID-19 during these challenging times as well. There's a poem by Kay Ryan, it's entitled; We're Building the Ship as We Sail It, which is I think very appropriate for a lot of our medical knowledge and understanding of COVID-19 as we're living through this pandemic with our medical knowledge and our biologic knowledge physiology is kind of constantly evolving, and what we thought we were doing correctly six months ago maybe it will be changed and maybe well be changed again in another six months. So we always have to take it with a grain of salt, the information that we're given and put that into a kind of a little bit of a framework of, we're still building the ship as we're moving forward.

Just a little bit of background, the current fatality rates from COVID-19 are very variable depending upon where you are, depending on old you are, depending on the risk factors. If you look at some data that was published, that of England, if you're above the age 75 mortality from COVID-19 all people, not bladder cancer specifically, it was about 11% and that's a variable between male and females, very specifically men with an 11% and females with 4%. Just to put that into a little bit of context, US fatality rates over around 2.8%, which is about a tenfold plus higher rate than the influenza. But again, very regional and those numbers are continuing to change based upon who is afflicted and who contracts the disease and then fatalities, as we know. Over the end of the summer and into the fall, we've seen higher rates of younger people affected which lowers fatality rates overall.

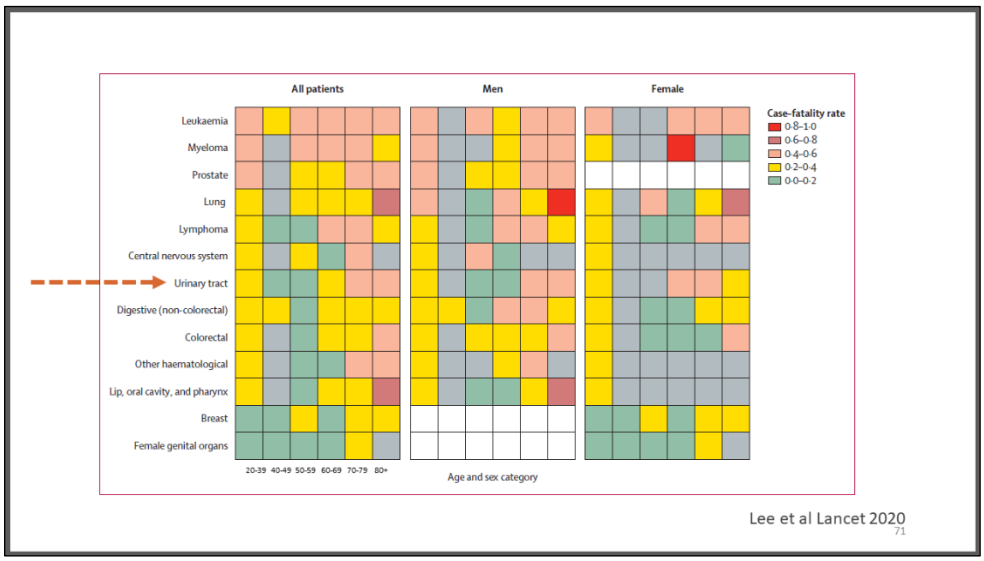


There is data that was published in The Lancet looking at cancer rates and about a 13% mortality for those patients with cancer and develop COVID-19. Early data out of China actually showed about a three, four increased risk of fatality for those patients with cancer and contracted COVID-19. Some of that data has been walked back a little bit because the Chinese population has much higher risk of lung cancer, which can also be a co-variable for some of these mortality outcomes. As well as some of that data came out of Wuhan, which obviously showed an overwhelming resource issue regarding care. So not necessarily associated with cancer diagnosis itself, but maybe a resource issue as well.

But what we know is that the risk factors associated with COVID-19 mortality are age as I've already described, smoking status, male sex, comorbidities, active cancer versus remission, performance status, and use of Azithromyacin and Hydroxychloroquine, which has actually been shown to have an adverse effect. And you can see here, I kind of highlighted, although not completely those patients are those risk factors that are also associated with bladder cancer. As you can see the top three there are also affiliated with bladder cancer. So you see our bladder cancer patients may be, just based upon their own demographics, at higher risk for having issues.

There currently is a COVID-19 Cancer Consortium, so a lot of the data that gets published right now at the Lancet is UK based with their kind of retrospective series. But right now, for a lot of the cancer centers in the US we're collecting data retrospectively looking at COVID-19 and cancer patients to see what outcomes we're seeing in the United States. So again, if you're seen at a cancer center, you may be enrolled in one of these consortium.

So not all cancers are the same, we know that. Leukemias are differently than myelomas than they are prostates, than they are lung cancers, than they are CNS tumors. And you can see here, this is data that was published out of the little Lancet. Each little box represents an age bracket, which I've highlighted on the bottom, age 28 to 39, 40 to 49, etc. And you can see urinary tract cancers actually fall in a slightly more favorable zone than some of the other cancers for those patients that have contracted COVID-19, and they've either had therapy within the past 12 months, surgery within the past month or on palliative treatment. So a little bit of good news. There's not a lot of good news out there, but urinary tract cancers actually tend to be fair a little bit better when having a concomitant COVID-19 infection.



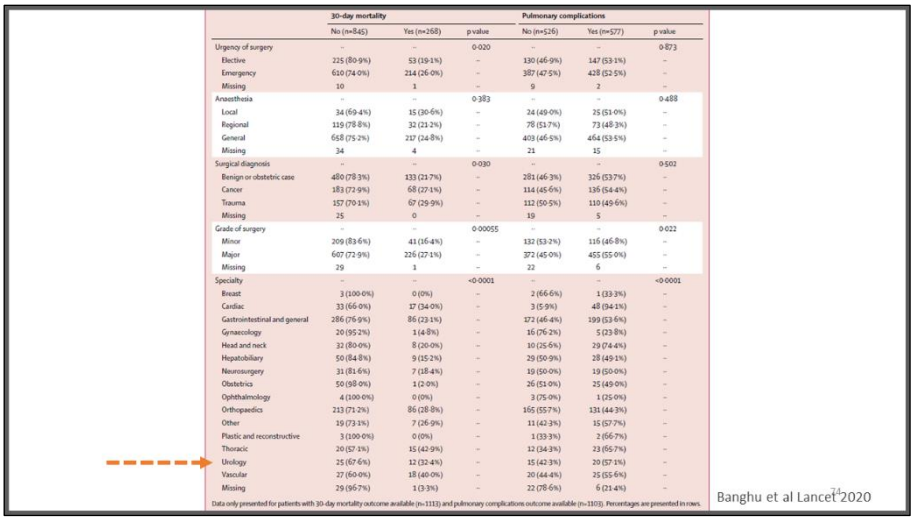
Overall, the total mortality from this patient population in this study by the UK was about 30% for cancer patients. But again, it's very variable based upon age sexes, I've already described some other co-variants. Some people ask about antineoplastic therapy and, "recent can I continue to undergo treatment if I've been infected with COVID-19." And this again, was another study that was published at The Lancet looking at your risk factors if you've had antineoplastic therapy within four weeks. And it's not necessarily associated having cancer outcomes or cancer treatment within that four week period to have a worse outcome. These, what I highlighted by the arrows again, are things that are common themes regarding COVID-19, sex, male sex, age, cardiovascular disease, and hypertension are the things that are driving our patients to have mortality, not necessarily that cancer diagnosis and or that cancer treatment.

So I like to emphasize that because we all know that aggressive bladder cancer tends to be, or has potential to be a lethal disease and we don't want to necessarily delay therapy if we think that patients can tolerate treatment.

Again, in active COVID infection we still would proceed with caution. And some people ask now that we've seen an explosion of the immunotherapy options for bladder cancer patients, either in the adjuvant setting or in the metastatic setting or palliative setting, we see that the mortality is not necessarily associated with type of treatments, either immune therapy, chemotherapy, radiotherapy, or targeted therapy. We haven't seen a whole lot of difference in terms of the type of therapy in association with mortality, so these medications probably are pretty safe to get.

On the flip side, if you look at 30-day mortality from surgery and pulmonary complications from surgery, again, data out of the UK, looking at mortality risk from operations you can see that about 30% of patients who had a COVID diagnosis around the time of an operation had a mortality, which is much higher than obviously the general population or non-COVID patients. If you look at the pulmonary

complications, which we know that this is potentially a pulmonary center disease, about 50% of patients had pulmonary complications after surgery with a COVID diagnosis. And this is either COVID diagnosis within seven days pre-surgery or 30 days post-surgery. There is a risk associated mostly with anesthesia with an active COVID diagnosis, so it's something that we all need to be consider of.



	30-day mortality			Pulmonary complications		
	No (n=845)	Yes (n=268)	p value	No (n=526)	Yes (n=577)	p value
Urgency of surgery	..	..	0·020	..	..	0·873
Elective	225 (80·9%)	53 (19·1%)	..	330 (46·9%)	147 (53·1%)	..
Emergency	610 (74·0%)	214 (26·0%)	..	387 (47·5%)	428 (52·5%)	..
Missing	10	1	..	9	2	..
Anaesthesia	..	..	0·383	..	..	0·488
Local	34 (69·4%)	15 (30·6%)	..	24 (49·0%)	25 (51·0%)	..
Regional	119 (78·8%)	32 (21·2%)	..	78 (51·7%)	73 (48·3%)	..
General	658 (75·2%)	217 (24·8%)	..	403 (46·5%)	464 (53·5%)	..
Missing	34	4	..	21	15	..
Surgical diagnosis	..	..	0·030	..	..	0·502
Benign or obstetric case	480 (78·3%)	133 (21·7%)	..	281 (46·3%)	326 (53·7%)	..
Cancer	183 (72·9%)	68 (27·1%)	..	114 (45·6%)	136 (54·4%)	..
Trauma	157 (70·1%)	67 (29·9%)	..	112 (50·5%)	110 (49·6%)	..
Missing	25	0	..	19	5	..
Grade of surgery	..	..	0·00055	..	..	0·022
Minor	209 (83·6%)	41 (16·4%)	..	132 (53·2%)	116 (46·8%)	..
Major	607 (72·9%)	226 (27·1%)	..	372 (45·0%)	455 (55·0%)	..
Missing	29	1	..	22	6	..
Specialty	..	..	<0·0001	..	..	<0·0001
Breast	3 (100·0%)	0 (0%)	..	2 (66·6%)	1 (33·3%)	..
Cardiac	33 (66·0%)	17 (34·0%)	..	3 (5·9%)	48 (94·1%)	..
Gastrointestinal and general	286 (76·9%)	86 (23·1%)	..	172 (46·4%)	199 (53·6%)	..
Gynaecology	20 (95·2%)	1 (4·8%)	..	16 (76·2%)	5 (23·8%)	..
Head and neck	32 (80·0%)	8 (20·0%)	..	10 (25·6%)	29 (74·4%)	..
Hepatobiliary	50 (84·8%)	9 (15·2%)	..	29 (50·9%)	28 (49·1%)	..
Neurosurgery	31 (81·6%)	7 (18·4%)	..	19 (50·0%)	19 (50·0%)	..
Obstetrics	50 (98·0%)	1 (2·0%)	..	26 (51·0%)	25 (49·0%)	..
Ophthalmology	4 (100·0%)	0 (0%)	..	3 (75·0%)	1 (25·0%)	..
Orthopaedics	213 (71·2%)	86 (28·8%)	..	165 (55·7%)	131 (44·3%)	..
Other	19 (73·1%)	7 (26·9%)	..	11 (42·3%)	15 (57·7%)	..
Plastic and reconstructive	3 (100·0%)	0 (0%)	..	1 (33·3%)	2 (66·7%)	..
Thoracic	20 (57·1%)	15 (42·9%)	..	12 (34·3%)	23 (65·7%)	..
Urology	25 (67·6%)	12 (32·4%)	..	15 (42·3%)	20 (57·1%)	..
Vascular	27 (60·0%)	18 (40·0%)	..	20 (44·4%)	25 (55·6%)	..
Missing	29 (96·7%)	1 (3·3%)	..	22 (78·6%)	6 (21·4%)	..

Data only presented for patients with 30-day mortality outcome available (n=1113) and pulmonary complications outcome available (n=1103). Percentages are presented in rows.

Banghu et al Lancet 2020

Now I've highlighted, again, the urology numbers below, which are pretty consistent with what this report was. The urology numbers in this study were actually pretty low. And again, it wasn't drilled down to see whether these are bladder cancer specific numbers or just urology numbers, but overall, these are in line with what we see. And again, this is probably consistent with what our patient populations are in terms of risk factors. The other consideration is that COVID has a significant impact on cancer screening, this is data that was published out of JAMA, and you can see these are screening numbers and new diagnosis numbers really from the beginning of the pandemic for breast cancer, colorectal cancer, lung cancer, pancreatic cancer, and gastric cancer. And the tabs on the left, which are that dark blue are the baseline, and then the weeks following the beginning of the pandemic in the United States. And this is data taken from Quest.

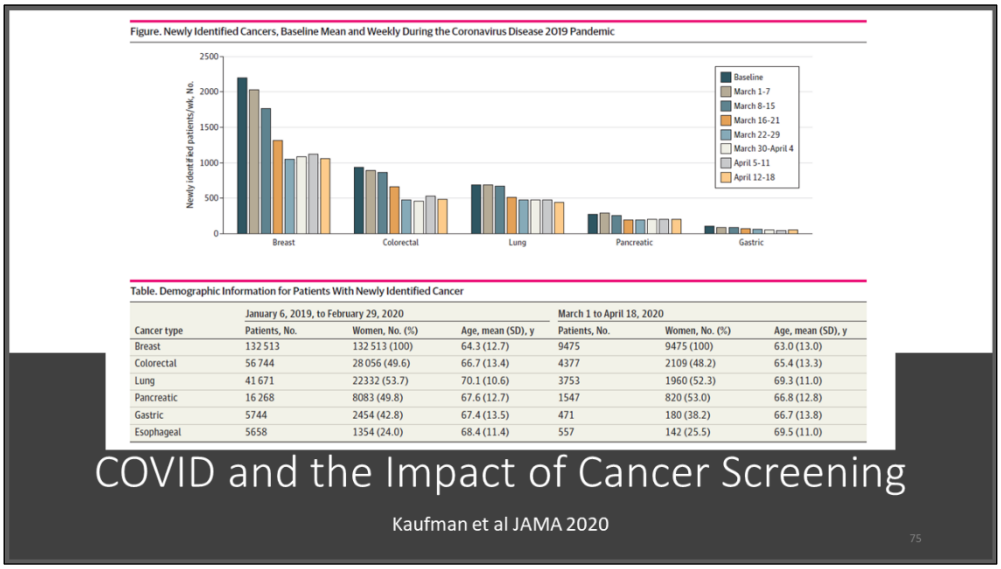


Table. Demographic Information for Patients With Newly Identified Cancer

	January 6, 2019, to February 29, 2020			March 1 to April 18, 2020		
Cancer type	Patients, No.	Women, No. (%)	Age, mean (SD), y	Patients, No.	Women, No. (%)	Age, mean (SD), y
Breast	132 513	132 513 (100)	64.3 (12.7)	9475	9475 (100)	63.0 (13.0)
Colorectal	56 744	28 056 (49.6)	66.7 (13.4)	4377	2109 (48.2)	65.4 (13.3)
Lung	41 671	22332 (53.7)	70.1 (10.6)	3753	1960 (52.3)	69.3 (11.0)
Pancreatic	16 268	8083 (49.8)	67.6 (12.7)	1547	820 (53.0)	66.8 (12.8)
Gastric	5744	2454 (42.8)	67.4 (13.5)	471	180 (38.2)	66.7 (13.8)
Esophageal	5658	1354 (24.0)	68.4 (11.4)	557	142 (25.5)	69.5 (11.0)

COVID and the Impact of Cancer Screening

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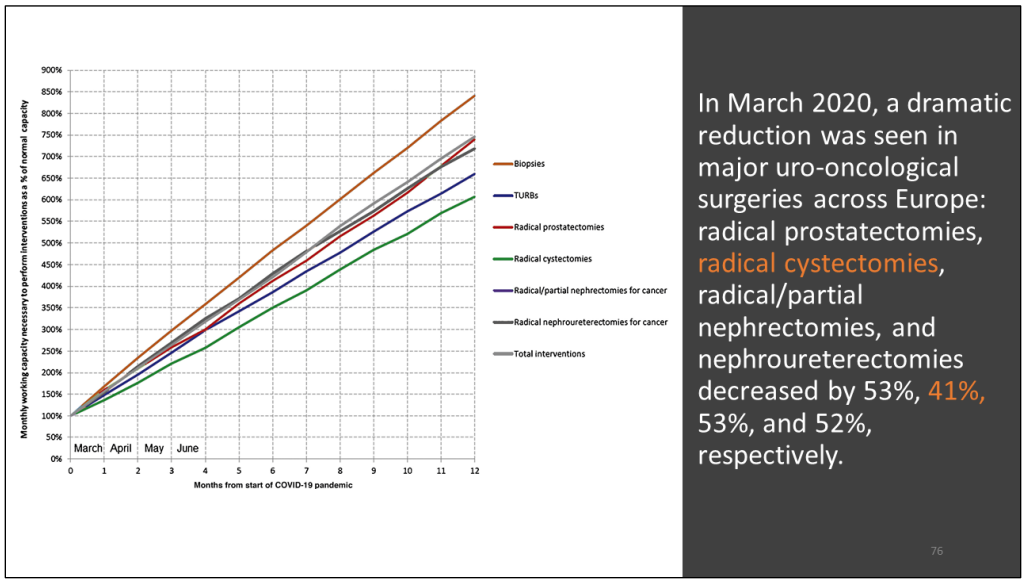
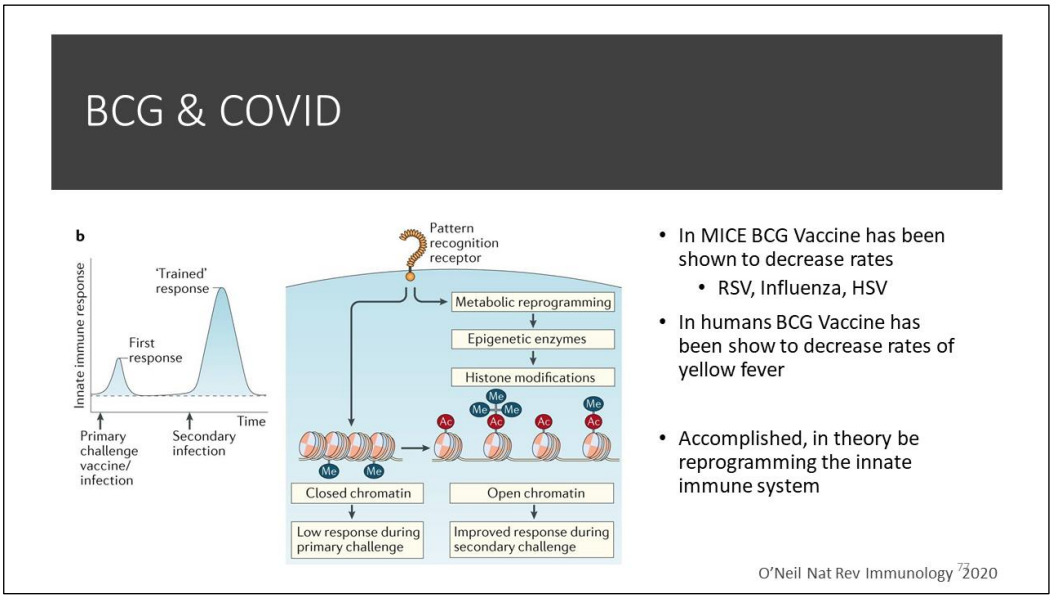
And you can see the screening numbers drop off substantially at the beginning of the pandemic, and we're probably still seeing that today. I know there's a lot of op-ed pieces and journals, etc., talking about that challenge. And this is significant for two reasons. One is that patients who have a delay in diagnosis may have progression of their disease and may present with later stage disease and therefore will affect their overall mortality. Number two, as I'll show you in the next slide, this is likely going to affect the hospital systems in terms of what most people consider to be acatch-up of care . So after pandemic is resolved we're going to see a deluge of these new cancer diagnosis and be working overtime to try to take care of patients.

This is data that was published at a European centers when they basically shut down everything in early March and looking at everything. You can see in the green line, which is the lowest line there, radical cystectomies, TURBTs is this next blue line up from that. And from the time of March, April, May, June,

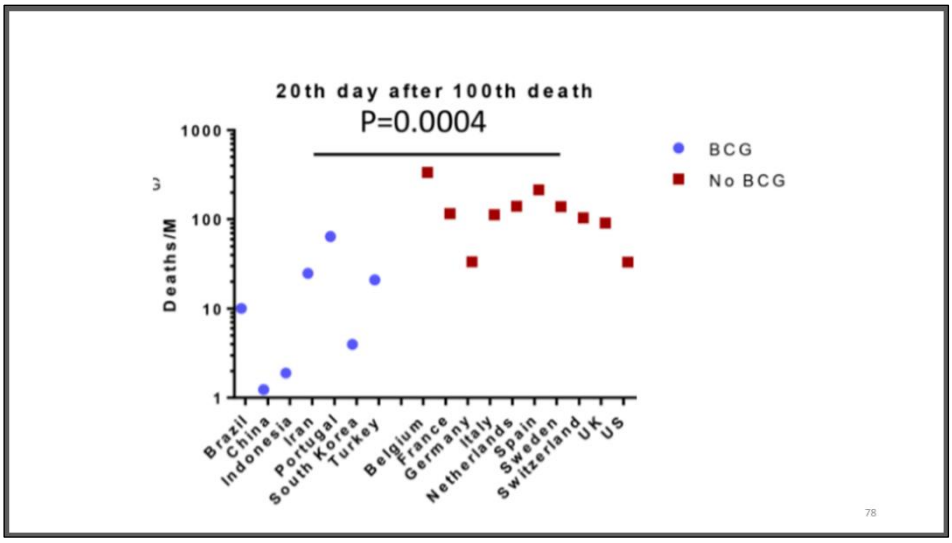
you can see months on the bottom and you can see working capacity as the Y-axis there necessary to perform interventions. So what we're saying is if you flip to month eight and then scroll up, you can see that we're going to need 400% capacity to what we have pre-pandemic just to take care of patients who have a delayed presentation or pieces were canceled, or operations were postponed based upon this information. So we're going to see this flood of patients and have a capacity issue just to take care of our standard cancer patients post-pandemic, whenever that is. And you can see the further we get from pandemic, depending upon shutdown levels, the worse it becomes. And so this delay in diagnosis and delay in treatment is certainly going to affect both the positions, cancer diagnosis, and patients in particular.



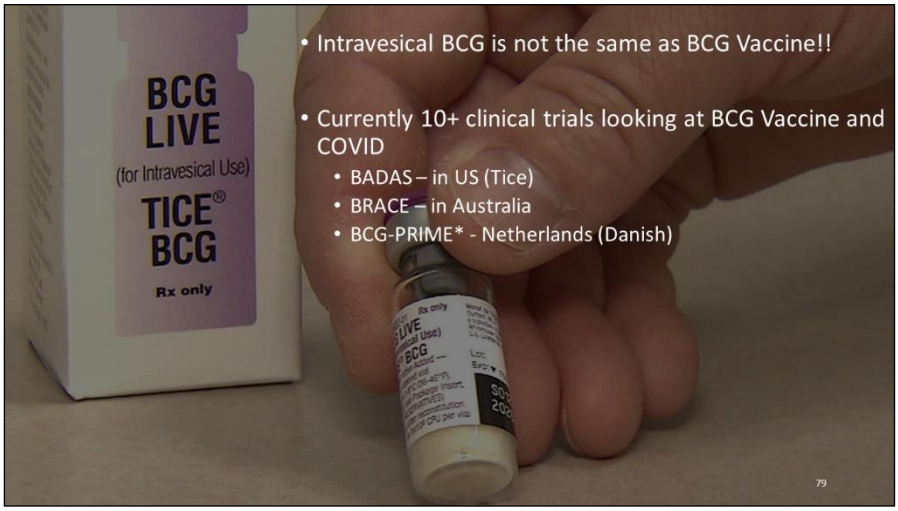
Some people have asked about BCG in COVID and there is a possibility of a relationship there. The reason being the BCG vaccine, not the BCG therapy that people get into basically for bladder cancer, but the BCG vaccine, which was developed in the 1920s to try to prevent pneumococcal pneumonia is given frequently still in a lot of Eastern countries to try to prevent pneumococcal meningitis in small children or infants. It hasn't been shown to decrease pneumococcal pneumonia in adults, but it's still given frequently to young children to decrease that pneumococcal meningitis. In mice, what we've seen is that the BCG vaccine has been shown to decrease rates of RSV-respiratory syncytial virus, influenza, and herpes simplex virus. And the human's BCG vaccine has also been shown to decrease rates of yellow fever. They think that this is accomplished by reprogramming the innate immune system with initial challenge with the vaccine. And then you can see some of our myeloid cells, natural killer cells change their response and actually you are kind of revved up and can better fight other insults or other infections.



The reason why this was considered is that if you actually look at countries with BCG vaccines, which are those blue dots versus the red squares, which are no BCG vaccines it looks like if you kind of splint a little bit that there's decreased death rates associated with those countries who have had prior BCG vaccination programs. So extrapolating some of this data, there were thought being well, can we use BCG to treat or to prevent COVID-19 infections or to prevent COVID severity? This data has to be taken with a grain of salt. Obviously, there's a lot of other factors that are involved, intrinsic patient populations, age of patient populations, health care systems, testing, all that goes into these factors. But this was sort of hypothesis generating data to establish the concept of maybe BCG vaccination as either therapy, preventative, or decreasing severity of COVID-19 infections.



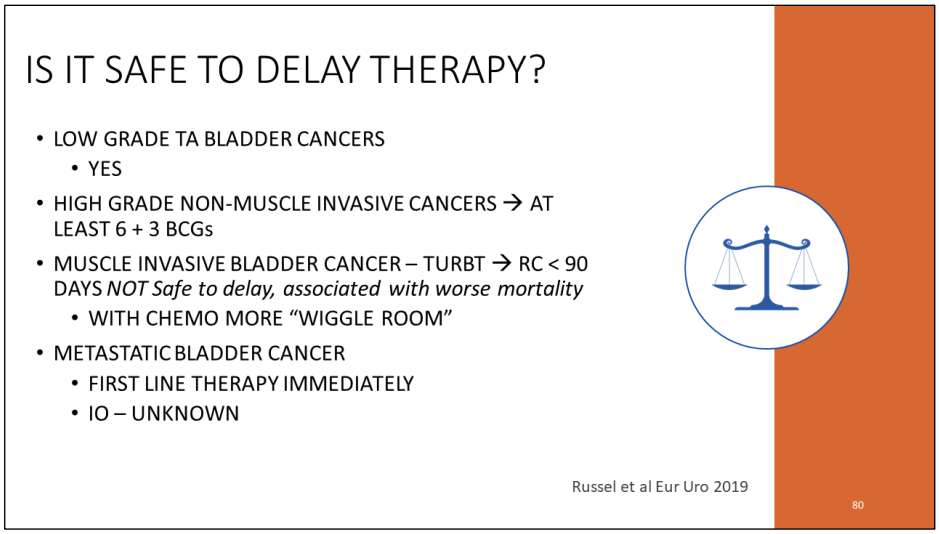
And with that, there are about 10 plus, now, clinical trials looking at BCG vaccination and COVID. In the US there's the use of BCG TICE, for what I considered to be the bad-ass trial, I'm not sure how they are formally commenting on that. In Australia, there's the BRACE trial and BCG-PRIME in the Netherlands, but there's a host of other in France, etc., BCG vaccinations, trials to look to see whether we can affect COVID outcomes. Just a note, intravesical BCG is not the same as the BCG vaccine, which is given subcutaneously, typically in the arm for therapy. And unfortunately, a lot of this registry data is also not available, so I can't tell you where they are in terms of enrollment in these trials or what any early results are.



Some other common questions that come up is, "is it safe to delay therapy for low-grade TA bladder cancers?" We think the answer is yes, those are typically have a low rate of becoming invasive and high-grade tumors are less likely to become progressively worse cancers.

For high-grade non-muscle invasive cancers we recommend at least six plus three BCGs, that's an induction course of BCG plus three maintenance doses that's been shown to be the most effective if you're going to do anything or you need to decrease the BCG, or there's decreased the BCG availability. For muscle invasive bladder cancers we know that there it's not really safe to delay therapy for very long. We typically don't want to go above 90 days because that's been associated with a worse cancer

specific mortality, the overall mortality, the number of studies. So typically, in this setting of pandemic we don't want to delay a radical cystectomy. If you're getting chemotherapy and the neoadjuvant or before surgery setting, maybe a little bit more wiggle room because there are some patients that either are down staged with chemotherapy or are complete responders to chemotherapy, in which case maybe we can delay a definitive radical cystectomy for a little bit longer if such a case arises.



Metastatic bladder cancer is a lethal disease. It's likely more lethal than COVID is, and therefore patients should not delay therapy for their metastatic bladder cancer. First-line therapy should be started immediately, particularly if it's chemotherapy. The risk of immunotherapy is, we're getting more information but it's truly unknown. But again, in the setting of metastatic bladder cancer, which is universally lethal, immunotherapy should likely be started as well.

We talk about chemotherapy, the reasons why people are concerned about cancer patients is the fact that A; they carry some of those risk factors associated with them that make them at the higher risk for COVID-19 adverse event, but also they're potentially getting treatment. And as I said before, we think that around the time of treatment with the COVID-19 diagnosis, that it may be safe to give chemotherapy, although active infections, we probably would withhold.

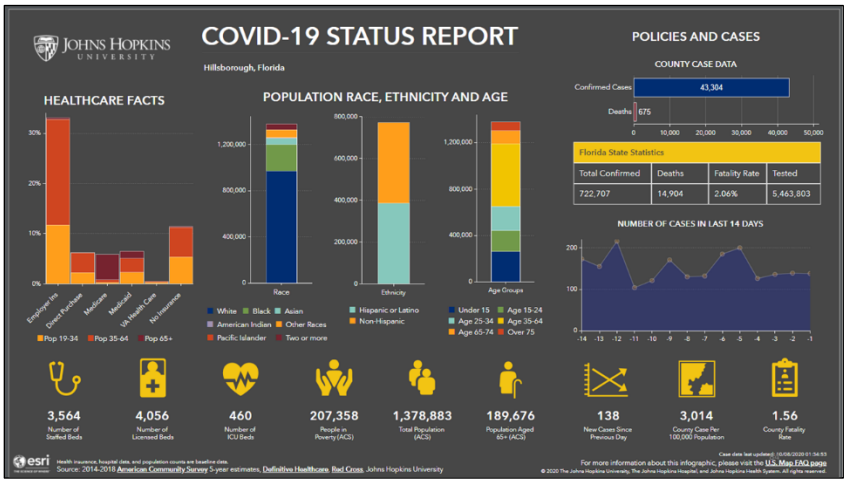
For patients who get chemotherapy, it's usually gemcitabine and cisplatin or something called dose-dense MVAC which is a four-drug regimens, which is associated with neutropenia where essentially the white blood cell counts would drop. And febrile neutropenia, which is even more of an event where we think that there potentially is a source of infection in the setting of a low white blood cell count. Because of this, some people feel that we should move forward with gemcitabine and cisplatin, or with MVAC because the risk of febrile neutropenia is lower. That being said, a lot of the dose the dose dense MVAC regimens can be given over six weeks, whereas the gemcitabine and cisplatin combinations can be given over 12 weeks. So there's a little bit of a yin and a yang in terms of which regimen should be used in order to get patients through chemotherapy, particularly in a new adjuvant setting. Immunotherapy carries a little bit less information just because it's been around for a shorter period of time, particularly as it relates to COVID-19 about one in six patients on immunotherapy can have a hypersensitivity reaction. And one of those hypersensitivity reactions is a pneumonitis, which is a lung inflammation. Obviously in the setting of a potentially pulmonary centered viral infection, and pneumonitis is not something that we would want to see. And some studies have showed about a 2.8 for risk of hospitalization compared to general populations for patients on immunotherapy.

Again, if you're on immunotherapy for bladder cancer, you will likely have advanced disease and we wouldn't still want to necessarily delay therapy. Surgery can also be immunosuppressive, so around the time of radical cystectomy, more so than a cystoscopy and a bladder biopsy that cystectomies can be immunosuppressive and also associated with hospitalization rates or re-hospitalization rates of about

30% within 30 days. And so we need to be also aware that there are some immunosuppressive effects of some of the things that we're doing for patients. I'm not necessarily advocating delay, but I think that we need to be cognizant of these risks. If you're actively infected with COVID-19, we typically recommend delaying BCG for at least three weeks and delaying chemotherapy and immunotherapy until that infection is cleared.

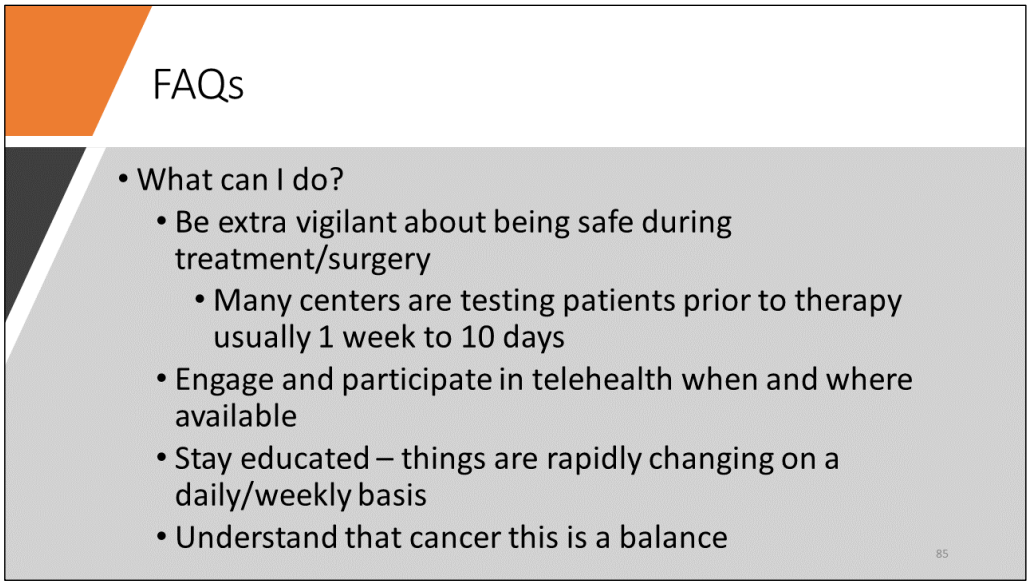
There's also some long-term effects, which are completely unknown. As I said, it's apropos to this, we're building the ship as we sail it. Unknown long-term complications, that could be neurologic, could be vascular, could be cardiac with COVID-19 infections. And so again, we're doing the best we can with the data that we have. Three years from now, when we look back at all of this information, we may come to different conclusions. People ask about survivorship. So for patients that are survivors or bladder cancer survivors with no active disease, you're probably not at a higher risk than the general population. And people ask about the risk of getting COVID-19. It's a very, very regional and I highlight the Johns Hopkins website here, which you can actually get localized data to your, I think, zip code, but at least to your County.

So again, if you log into the Hopkins website or Google “Hopkins COVID data” typically would bring you to their landing page and their application, and I just highlight that. In the next here, you can see the COVID-19 status report for Hillsborough County where Moffitt Cancer Center is, and where I live. And on the right side of the screen you can see the Florida statistics. You can see the number of the cases in the last 14 days. A lot of healthcare policy people all feel that if you had an infection rate that's less than 5%, that's an opportunity or an option for opening up of the economy and being a little bit more liberal in terms of restrictions, but when patients often come in. Most of what we're seeing for COVID-19 is community acquired disease, not necessarily hospital acquired disease. And so your risk of getting COVID-19 is typically going to be very regionally dependent depending on what the local statistics look like.



Additional frequently asked questions, "what can I do?" Be extra vigilant about being save during treatment and surgery. Many centers, including Moffitt, are testing patients prior to their therapy or surgery. So pre-chemotherapy, pre-immunotherapy therapy, pre-surgery within 72 hours, one week to 10 days prior to surgery. If your doctors are planning to do something to you, make sure that you stay extra safe because the last thing you want to do is come in, positive test. Even if you're asymptomatic, they're going to end up delaying

your care until you're cleared. Which is going to delay your cancer therapy. So be extra vigilant around being safe during treatment and surgery. Engage and participate in telehealth when we're available. We certainly can't do cystoscopies virtually, but you can certainly schedule telemedicine appointments with your physicians or APPs (advanced practitioners like a PA or NP) if you want to follow up, if you want to do symptom checks, if you want to review scans that may have already been done. And say educated. Things are rapidly changing on a weekly, monthly basis. I know that there's some discussion about vaccines and the availability of vaccines, and then again, its changing on a weekly, monthly basis.



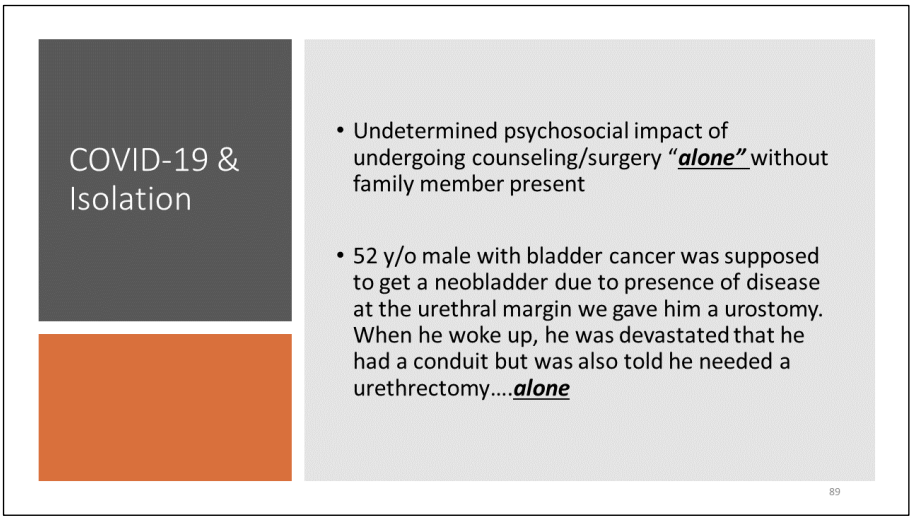
We also have to understand that for cancer this is a balance. This is a balance between cancer that can potentially affect your mortality and COVID-19, which can affect your mortality. But as I said, for those patients with very aggressive cancers, that is very, very important to treat, and we shouldn't necessarily not get that treated just because there's a pandemic going on. As one of the administrative folks at Moffitt says, "cancer is likely to kill more people in Florida than COVID-19 will, and so we still need to be vigilant about treating patients with cancer." And the last thing I like to mention is this concept of social distancing and the stress that it puts on our cancer patients. So traditional oncology care is delivered through essentially patient contact with either clinic visits, surgical stays, infusion sessions, radiation planning and treatment appointments, hospital admissions, lobotomy for blood test, radiographic imaging studies, all of these are touch points that patients have to go through. And so it makes it really hard for our patients to perform social distancing in order to get their care, and maintain their care, and do their care. And that adds a lot of stress and anxiety to our patients. And we've seen it. Patients not coming in for follow-up appointments, they're concerned about contracting disease, etc.

And so I just like to highlight that we can likely do a lot of this stuff safely, but it adds a lot of stress. I can only imagine that with a cancer diagnosis, and COVID, and having to do multiple appointments, etc, adding that anxiety. And there's actually data to support that our patients are anxious about this. So 96% of patients report that they're stressed out about hearing about the severity and contagiousness of COVID-19, 88% are concerned about the length of quarantine and social distancing requirements, 83% have made changes to their social habits, 80% have made changes to their daily personal routines. And so we know that this is affecting patients on a psychosocial level. And then March, in April and even probably later, a lot of hospitals went on lockdown and they didn't allow visitors. You can imagine you're a patient going through infusion, you're going through surgery, you're through an appointment where you-

You're in confusion, you're going through surgery, you're going to an appointment where you're getting a cancer diagnosis, and you don't have any psychosocial support network. So this was data that was

published, basically pre and post hospital lockdown, interviewing patients, getting qualitative responses for what their experience is like. You can see on the top, there's quotations, "When you had visitors, how did it make you feel?" It lifted my spirits." When people come close to you, your spirits are lifted. And on the flip side, at the bottom, "How did the lack of visitors make you feel after surgery? It was really hard. I just wanted to see my daughter. She cried on FaceTime every day." And so, this psychosocial impact will probably have repercussions for patients' care down the road, and it's not something that we should take lightly at all.

As we see ebbs and flows of the pandemic, we're going to see intermittent lockdowns, I imagine, continue for different hospitals, depending upon that infectivity rate in the regional areas. And again, in my own personal practice, recently had a 52 year old male with bladder cancer, and he was supposed to get a neobladder, and due to his factors of having disease of urethral margin, we ended up giving him an ileal conduit urostomy. And he was appropriately counseled that that was a possibility. But when he woke up, he was devastated. And we talked to him about maybe, potentially, doing a urethrectomy down the road, which would be a second surgery for him, at the time. And you can imagine going through this, waking up from surgery, you don't have your family there to support you through all of these conversations, through all these changes that your body's going through. And, I used to say that you can only imagine what it is, but now I've seen it, personally. I've seen it, and it's really hard to go through.



I have other specific examples of my own patients. We have ostomy teaching on the one that's, "Taking care of my father, and I need more instructions than a Zoom call." Again, we try to make allowances for patients to come in for urostomy care and urostomy teaching, but you can imagine all of the challenges that are associated with these different changes that our patients are going through. Again, "I would discuss with my father, but he's not comfortable with any of this, especially COVID-19." Obviously, constantly changing rules that we have to try to convey to patients and their families. I even rescheduled a young lady twice because of the visitor policies. And she refused to have surgery if her daughter could not be in a hospital. So again, we're seeing this impact, both on a psychosocial level, as well as on a clinical level, cancer staging, etc., all the way down the road.

There was one question that Stephanie had that came through an email beforehand, so I can address that. And then we'll open up for additional questions. One of the questions was, "Does being on immunotherapy, put me at risk for a cytokine storm.?" The answer for that is that we don't know the answer. There are currently two clinical trials going on right now, looking at checkpoint inhibition, particularly PD-1/PD-L1 inhibitors, actually to regulate the immune system during COVID-19 infection. So we think that there's probably value in, actually, regulation of some of that. Some of the T cells for patients with COVID-19 diagnosis get exhausted. And therefore, we think that if we regulate them with PD-1/PD-L1, maybe that'll be an option. There's another study looking at these medications, actually, that can affect the cytokine storm, which is typically modulated by something called IL-6 and TNF alpha.

And there's three clinical trials going on right now, looking at some of those antibodies to those cytokine storm-type modulating factors, which potentially will affect our outcomes. But the answer is we don't necessarily know, but there's more to come.

Stephanie Chisolm: Wow. Thank you so much, Dr. Poch. That was really informative and very comprehensive. I do think most of the questions that we have gotten that were specific to COVID-19 are related to BCG, obviously. There was one quick question. If you could just explain what neoplastic therapies are. Is there a particular type of therapy?

Dr. Michael Poch: No. So now that, back when I was a resident, we used to have basically chemotherapy for a lot of the urologic malignancies. So it was basically cytotoxic chemotherapy, which is what we typically consider gemcitabine, cisplatin, etc. Over the past two decades, we've seen an explosion of anti-cancer treatments, immunotherapy, targeted therapy for renal cell carcinoma. So rather than saying just chemotherapy, we're typically using a lot of determinant and neoplastic therapy as a catchall for including both immunotherapy, chemotherapy, and other things like targeted therapy. And for prostate cancer, we consider androgen deprivation therapy to be antineoplastic.