When Chip and I were talking here a minute ago he asked me about who I thought was my most influential mentor and I told him that I had felt blessed that I had so many mentors. And that among the mentors I had, most recently, was Dr. Reynolds himself. I think he was a little surprised to hear that, but for several years I’ve known and enjoyed my relationship with him and learned so much from him, and I’m very grateful to him.

So what I’d like to do today, and I say – I apologize to the audience that we have to boot this up – to share with you some of the lessons that I’ve learned along the way. I’ve titled today’s talk, Geriatrics: From Bench to Bedside to Policy, because the research is taking me not by intent and not by design but through all those different steps and it’s been a wonderful trip thus far and I’m looking forward to what remains. But along the road it also occurred to me that what I was uncovering as part of this research, you know, armed with you know thigh high boots and camera, going down into putting tubes where normal people don’t even talk about, were lessons that were making me a better doctor, a better clinician, a more informed researcher and what might even have lessons beyond the field of incontinence for all of us as we try to provide better care to older people in general. And that’s what I’d like to share with you today.

Because I’m a clinician I guess I have to start with a clinical case. It’s a real case, it’s an 88 year old woman with Parkinson’s disease who suffered a hip fracture after falling and then in the hospital became confused, was treated with Allopurinol, a drug, an antipsychotic, and then developed urinary incontinence. And on her exam she was in a wheelchair, she was Parkinsonian, she had heart failure and fecal impaction, her bladder was distended, she had atrophic vaginitis, and in the words of the...
resident house physicians, interns and residents she was really a wreck. Not the kind of person that one held out much hope for, not the kind of person that our consultants who specialize in incontinence are clamoring for, not the kind of person who appears routinely in randomized controlled trials performed by drug companies either to show that their drugs work; and yet the kind of patient who inhabits our hospitals and our country and this globe every day of the year.

Moreover 2 months later she was back at home and dry. So we were faced at the outset with two approaches when we were asked to see her. The patient was a traditional one, which had been advocated by the specialists who take care of bladders normally. They said well, she’s cognitively impaired and she is mobility impaired, and she’s really a wreck and she’s had a hip fracture and the only thing we really can do when she’s in urinary retention is put in a catheter and put here in a nursing home. And we thought maybe there was another way, a geriatric way. The family thought about it for a while and they were nervous about this, this idea of the geriatrician was a new concept back then. But we told them all we would do was just delay things a little bit, and then if we were wrong they could go back to the urologist and they wouldn’t have lost anything. And they figured okay, well if nothing is to be lost let’s give it a try.

And as I said 2 months later she was back at home. She was mentally intact, fully mobile and entirely continent. And in order to understand how such a dramatic transformation might have been effected it’s probably worthwhile to take a journey back in time, back through the myths of time to that dim, dark period in our primitive past when we understood oh so little about how the bladder worked, to about 20 years ago. And really it was about that recently that, that the whole field of
geriatrics really started developing, no more than 30 years ago did we really start getting a good handle on it.

So if we go back to that time when I was still a Fellow, we decided that if we were going to tackle this we had to start looking at some of these widespread dogmas and see which again were true and which wasn’t. And myth number 1, it’s called myth now because of what we found, but this was a belief back then, incontinence is just simply a normal part of aging, it’s like gray hair and wrinkles. But we were blessed by the fact that we worked with people who had paved the way before us in the field of dementia. And this, if you just take the incontinence out of this sentence and replace it with senility or dementia it would have been the same thing, and may have been brave and bold enough back in the ‘60s and ‘70s to look at it and found that dementia and senility were not a normal part of aging. And so we decided that we should take the same approach to incontinence.

And so we were also fortunate because there was a large trial that was just being deployed through the National Institutes of Health called the Epis Trial, which was a large epidemiology trial and it was in East Boston, and those of you who have gone to Boston know that you’ll fly into Logan Airport and that’s right in the middle of East Boston, it’s a neighborhood surrounded on all sides by water, and connected to the mainland by a single bridge. And so we had captured an entire population, and in that population there were 4500 old people. And so my job as a Fellow who had proposed to do this study that no one else wanted and that they were in fact, the NIH was concerned that by virtue of allowing a Fellow to do this we would jeopardize the entire NIA’s epidemiology branch, because this was a study that was to look at the epidemiology of everything that afflicted old
people. And they were worried that if I went by and asked them do you wet your pants, the doors would be slammed in our face and that would be the end of all their study, forget my study.

So after 2 years of convincing them they finally decided to allow us to do it, and here is what we found. The prevalence of incontinence did indeed rise with age. And the way we did this, we had sex matched, language matched and culturally matched people because 1/3 of the population was Italian and only spoke Italian, and there were all sorts of other issues. But those were all adjusted for and we had to go in there and have tea and coffee with them and spend a long time in the house before they felt comfortable enough telling us about their most intimate secrets. And so it turned out that incontinence rates were low. They were lower than anticipated, but subsequent studies have shown that this is actually the real rate of incontinence that bothers people. So these are valid, although it was suspect at the time.

But what we also found was that although the rate of incontinence rose with age in monotonic fashion, at no age did it increase sufficiently to be norm in more than half the people. So lesson number one was incontinence is not in fact a normal part of aging, but clearly there was something going on here with age because the prevalence nearly doubled between 65 and 85. So trying to get a better handle on what was actually the role of aging itself we decided to look at people who were older but totally dry to see what was the impact of aging. And we thought that it might be some subtle thing, and to our surprise after investigating 100 people spanning 5 decades from age 60 to 101 here is what we found. Half were men, half were women. We found that half of this population in both sexes had a bladder that they couldn’t control, it’s called detrusor, that’s the muscle of the
bladder, overactivity, that is bladder spasms. So it goes to a certain amount and then it will contract on its own without the owner’s permission. Half of the men had an obstructed bladder, the prostate was blocking the outflow of urine. One in seven had a bladder that was very weak, and that a true normal bladder, as was identified in the literature, was probably only one of five older people who were totally dry and robustly happy. These people were all community dwelling, functionally intact, mini mental score, the mean, the median was 30 and in fact the lowest mental score was 28. Half of them consented to have a CAT scan that was normal, and none of them had an abnormality on urological exam. You could not get healthier people. Some of these people were flying around getting yoga lessons, I mean you couldn’t believe these people, they were college professors, MIT astrophysicists.

And yet this is what was found. And so the stunning conclusion from this, this was radically different from what occurs in younger people. In younger people zero people who are dry have an abnormal bladder, and 100% of people who are wet do have an abnormal bladder. This is obviously very different. And we were led to the inevitable conclusion that geriatric continence by contrast in incontinence in younger people result not from a normal urinary tract, but despite an abnormal urinary tract. That was pretty radical. So that clearly it began to shed some insight as to what was going on with aging and why incontinence in older people might be different from younger people, but it also provided us with a glimmer of hope that if you could take a different approach to incontinence in older people that was predicated on true geriatric physiology understanding it might actually be able to help people that have proved refractory in the past.
And in these studies were only underscored by a more recent study that were led by Professor Griffith and Dr. Tatich in our laboratory here of the brain which showed that in older people who are completely continent but consented to neural imaging with more advanced techniques than just CAT scans. But compared to younger adults, older people who live totally fine with their bladder still have decreased activation of their brain in the insular, who have decreased activation of their prefrontal cortex, which would normally inhibit the bladder, and they have increased activation of the anterior cingulate gyrus which we think of as compensatory function. And on top of this that older people therefore have less ability to sense when their bladder is full and less ability to suppress the bladder if it’s going to have a spasm. So this then led us to the understanding that while urging may not cause incontinence, which we thought was pretty well buried now, it’s not an inevitable cause of aging, but it was clear that aging predisposed the older person to becoming incontinent by setting the stage for it by removing your physiological reserve.

So that then led us to look at number two. If incontinence wasn’t normal in older healthy people, that didn’t mean it wasn’t normal in frail and demented older people. So that then led us to look at incontinence among nursing home patients. The population we looked at was 700 people, residents of nursing homes, average age was 90, more than half of them were demented, more than half of them had impaired mobility, so you couldn’t choose a more disabled population to look at and yet even in this population here is what we found. Here there was no question of ascertainment bias, these people lived and they were observed 24 hours a day by nurses and by research assistants, so there was no question that they were hiding or lying or embarrassed to tell. We knew if they were incontinent. And you can see here once again that same monotonic increase of the prevalence of
incontinence versus the severity of dementia. But for a geriatrician these data were very different because our urology friends said well this just proves that it is normal if you are demented, if you are incontinent. I said but look here, the people that were the most severe, and most severe in this study meant they had no discernible mental function whatsoever, and yet 20% of that population were completely dry. I thought that was pretty amazing. Moreover it occurred to me in my simplistic kind of way as a Fellow at the time that demented people were ________ types, they were the type who couldn’t get themselves out of bed and the kind that could. And it made sense that if you were totally demented and you were totally bedbound that obviously you’d be incontinent, but if you were totally demented and you could get up and walk, and there are many people like that, that it must mean that your odds of being continent are even better than 20%.

And so we looked at that. And here’s what we found. If you look at the ability to transfer, and I’m not talking about ability to walk, just to get yourself out of a bed into a chair you can see that once again there is a direct relationship between the presence of severity of dementia and the risk of incontinence. But look on the far right side and you can see that among the people who were bedbound, being bedbound roughly doubles that risk from 20% to 40%, from 40% to 80%, from 50% to 100%. So that meant that if you look at the people with no definable mental function whatsoever there is roughly a 50/50 chance that they will still be dry if they can merely transfer themselves from bed. Which meant the incontinence was not even evitable if you were 90 in the nursing home and totally demented. That was also pretty encouraging.
We also realized that people who are demented and frail had a host of other impairments and diseases and drugs that posed ability that could independently cause incontinence, independent of their dementia. And of those things as opposed to the _______ of the neurological process might be amenable to an intervention and improvement. And so the question was how much of the risk of incontinence was not the dementia itself but the mere neighborhood with which it held company, those other risk factors.

So we decided to do a logistic regression, which back then might have been the first logistic regression ever done in a nursing home population, but you know this was Boston and we were encouraged by the Framingham study and they looked at all these people and Framingham had found independent risk factors for heart disease. So we figured maybe we could take a similar approach for this. But I was worried because we had 10 times fewer subjects than Framingham did, that while they found five risk factors we’d be lucky to find two. But to our surprise here is what we found.

Ten, ten factors that were independently associated with the risk of incontinence, and they are listed in the order of the strength of their association from dependent transfers as number one in the strength of its association and all the way to your far right, diuretics was number 10. But it means that even with diuretics that it was the weakness of the strength of their association still had a P value of less than .05 and even after you knew all these others _______ that independently would increase the risk of incontinence. And we noticed that the things in white were the traditional things, that’s what Framingham had looked for in heart disease, other diseases. But because we were not
part of this evolving science called geriatrics we knew that diseases alone weren’t all it, we looked at drugs too which they hadn’t. And furthermore we decided to look at function. The drugs are in yellow and function is in green, and we think that that’s another reason that we were able to find these independent factors. We also noticed that function, dependency in transfer which I just showed you the preliminary data for, and dependency in dressing, that those two were the 2 of the 4 most strongly associated risk factors for incontinence. So that was even more encouraging. That meant that if you look at dementia, which is on your right, that was far from a dominating point and it was 7th in importance.

So there are a lot of implications to this thought. The first is that incontinence had always been on the bladder and the urinary tract, and here we found 10 independent associated risk factors, contributing factors to incontinence that giving somebody a bladder drug would do nothing for, in fact could make it worse. So the fact that people have ignored that the cause of incontinence was outside the bladder would mean that they obviously would be less successful in treating older people, and mistakenly conclude it was not treatable. Furthermore, it was multifactorial and therefore this search for the magic bullet is probably misguided, if you’ve got 10 causes there’s no bullet that’s going to hit all 10. Multidimensional, function was critically important. This was the first paper that ever showed that function is an important part of incontinence. And then there was an issue of dementia, there had been this, you know, this solid thing if the patient is demented then you know they are incontinent, and we found that it was an important risk factor, but all it did was double the risk, it certainly didn’t dominate the equation and therefore we concluded that it was no longer tenable to ascribe incontinence to Alzheimer’s disease in older people.
And finally from my point of view as a geriatrician, what was most exciting was that most of those factors I listed there are potentially treatable. So that then led us to propose principles of geriatric incontinence for the first time. And that were these. First aging while it doesn’t cause incontinence, predisposes to it. And it’s that it’s drugs and diseases and impaired function that are superimposed on that and that actually tip the balance and precipitate the incontinence, so the predisposed person is then precipitated in the continence. And that meant that there were two important corollaries for me as a clinician. First that there is other things, there is other drugs and other diseases and functional impairments that are treatable but are outside the urinary tract, or at least they are often treatable, but they are not urinary tract and so if I focus, get my focus out of the urinary tract I can offer a lot of help to older people.

And finally that even if the older person has an abnormality of their lower urinary tract you may not need to deal with that in order to make them dry. This was pretty radical at the time. In fact, I included this in a review article in the New England Journal and I was forced to take it out in order to get the article published. But if you looked at – because we didn’t have the data at the time that I just showed you, but if you went back to that slide where I showed you those totally dry people, and half of them had bladder spasms and half of them were obstructed, and 4 out of 5 had abnormal bladders and yet they were dry. So it meant to us that if you had somebody who was incontinent the fact that they had an abnormal bladder did not necessarily mean you had to fix the bladder in order to make them dry.
And then I started looking with a clinical correlate as examples of that and I found them in my practice everywhere. And you know the next day I failed to figure this out, I saw an older woman who had a flare of bursitis in her hip, and now she had pain and impaired mobility and she had incontinence. All I did is fix her bursitis, the pain went away, her mobility improved and her incontinence resolved and I never touched the bladder. So these are pretty useful principles it seemed and they could go a long ways towards providing initial insights as to why people have for so long thought that incontinence was normal with age and that it was untreatable.

So encouraged by that we decided to look a little further and said that alright, so it may not be normal to be incontinent if you are old, or if you are demented; but the next dogma was that if you are old and demented and incontinent the cause is a bladder that spasms this detrusor overactivity. Because after all, it’s the brain that gets the afferent signal from the bladder and is told, you know, I’m getting full, I want to go and the brain’s job is to inhibit that. And if the brain is damaged by Alzheimer’s disease or other causes of dementia then it won’t be able to control it. So we went into a nursing home this time and actually tried to do invasive testing in nursing home patients. Once again we met a number of problems, there were ethical issues of consent with dementia and as Chip and I discussed, this was probably the best reasons to be a philosophy major if you are going to go into geriatrics because you have to be able to wrestle with these. And the NIH decided that they would file an ethical objection, Harvard you know wrapped us over the head with this consent, it took 3 more years to get this through and everybody assumed that it was not only unethical to do because everybody knew that these people had that bladder problem, but also we probably would kill people in the process because they all would have bacteruria and we would be inserting a
catheter in and cause them to have urosepsis and they would die or get angina or I’d get angina.
Anyway it was – but finally we surmounted that and here is what we found.

We found that once again the widespread belief is not the fact. The facts are quite different. It was true that a bladder that spasms in detrusor overactivity was the dominant cause of incontinence in people who are demented, but it was not the 100% cause, which was what was in the books. Even geriatrician experts in the field such as Dr. Brocklehurst was writing that in his text. And I asked him about it as we were starting the study and he said he wasn’t sure it was worthwhile doing either because he was pretty sure this was the case, at least at the time. We found that 60% was due to this detrusor overactivity and that the remaining 40%, most of it was due to a problem at the outlet. That was pretty important because if the outlet is obstructed and you are going to give somebody a bladder relaxant you are going to throw them into retention. And if the outlet is incompetent and you give the bladder a relaxant you are going to increase the amount that’s in the bladder and that can make them more incontinent. So these were additional insights as to why traditional approaches to incontinence therapy had failed because people had believed that it was all about bladder spasms when in fact that wasn’t the case.

Furthermore you will see on the bottom two lines the bladder was only normal in 2% of these people, and we’ll get to that in a minute because there is this sense out that that there is this condition called functional incontinence. And it’s rampantly diagnosed in nursing home patients. But the reason that the patient is incontinent has nothing to do with the bladder, it’s because they have dementia and they’ve got immobility and so it’s a functional thing. And you can see there that
that’s not the case, the bladder is abnormal in virtually every one of those people. It’s not to minimize the importance of function as a contributor, as I have showed you, but it is to me that if you just decide it’s all function and you ignore the bladder you are missing an important opportunity to help people.

And finally as geriatricians the thing that we glory in but which bedevils doctors in general is the fact that even after we got rid of the function causes and the disease causes outside the bladder and the drugs outside the bladder and we finally got into the bladder itself and we felt we finally had got to the Holy Grail of simplicity you can see in the last line that half of those people had at least two and often three abnormalities or four in the bladder. So once again this concept that we are going to call the cause of incontinence, bladder diagnosis 1 is going to fall apart in half the people. So it’s not only multifactorial in the human, in the person, it’s also multifactorial in the organ system itself.

So here are the implications. First detrusor overactivity underlies fewer than 2/3 of the cases of incontinence even in frail 90 year old nursing home patients. Second, even when they have this condition it turns out that half the time they have a subtype of it that no one knew about before. So we had to come up with a name, and it was an odd name because if you used nomenclature at the time to develop a new disease we would have to call this the overactive/underactive detrusor, which is sort of stupid. It was because no one had anticipated such a condition could exist, that the bladder could be simultaneously trabeculated, diverticulated and look very strong and uninhibited and contracting all the time and yet be weak as heck. And so they thought that this was an impossibility, but this is what we saw. It was never seen in young people, it was frequently seen in old people and
in fact as you can see, in old people it was 32%, if anything it was more common than the traditional cause. So we found a new cause of incontinence as well, and that one was described in a separate article in JAMA. And then if you looked at the urethral abnormalities BOO is not for Halloween but for bladder outlet obstruction, or stress incontinence, that accounted for a third of the incontinence. So that means that there is an outlet problem in a third of cases, you are not going to make them better by giving a bladder treatment.

And then we thought well maybe the bladder spasms were mainly in the people who had impaired mentation and their outlet problems were mainly in the people whose brain works. And we found no association with that at all. And then we realized in retrospect it was one of those moments that you sort of hit your head, and you say da, there is nothing about Alzheimer’s disease or vascular dementia that would prevent the prostate from enlarging, and there’s nothing about those that would prevent the pelvic floor from weakening. So why would we assume that if you are old and demented you would not have an obstruction or you would not have stress incontinence. So again, we learned a lot. And then this idea that functional incontinence is the dominant cause of incontinence in older nursing home patients is just not the case. Almost 98% of them have a bladder abnormality in addition and maybe even it’s a dominant issue. And finally, that it would be foolish to assume that even if you knew the bladder cause that there was only one cause, it’s more than that.

So that then I just wanted to focus just a minute on functional incontinence and what’s wrong with it. The minute that we say that of course Mrs. Smith is incontinent, you know she’s in a nursing home, she’s 90 years old and she’s you know demented, here is the problem. First of all, we’ve just seen
the data that if you are demented, even if you have no mental function at all, you only have about a
50% chance of being incontinent. So just to ascribe this to that would miss a chance to help her.
Second we’ve seen how so many other things that are treatable, cause of incontinence, track with
dementia and functional impairment and if you could treat those, even if you couldn’t treat the
functional impairment, you could reduce her chance of incontinence or make her better. The third,
that if you know what’s going on in the bladder you have yet additional ways that you can help her
by treating the bladder spasms if she has them, or by treating her outlet problems if that’s the cause,
so that’s the problem in ascribing incontinence in frail demented people to functional in my, in my
view.

And that then led us to myth number four, that it may not be normal to be incontinent if you are old
or even if you are demented, and the causes may not be all due to a bladder that spasms. But then
the belief was that if you are incontinent and old you were less treatable if treatable at all. Now
before we took that one on we decided that wait a minute, this is really going to be daunting and so
maybe we ought to go back and review what our own data empirically had shown us to see if we
could get some insights that might help. And what we realized is that we now had a class of
paradigms, everything I had been taught in medical school about disease in general and from the
specialists on incontinence in particular seemed to be at odds with what I was finding with
experimental data out in the field.

In the young people I had seen, and had been taught with and even gone through a Fellowship for
incontinence we always found a single abnormality, it was always in the bladder or in the urethra,
and it was easy to impugn it as the cause. By contrast, all these older people I had had multiple abnormalities in multiple organs way beyond the bladder itself and it was impossible to figure out what was the cause. Again, the background of a philosophy major is very helpful to you because we had 10 things going on with Mrs. Smith, I challenge you to tell me what is the cause of the incontinence when any one of them could cause it or contribute to it. So it meant that we had to come up with a different approach, and that in turn led us to re-conceptualize our approach to the symptoms in general. And so we came up with this diagram that we put in JAMA about 15 years ago, and we decided that rather than trying to get into a paradigm for young people and another paradigm for old people the problem with that was there were many old people where the causes and the treatment were just the same if they were 85 as if they were 55. There are a lot of healthy, intact, robust 85 year olds out there. And there are some people who are under 70 in whom a geriatric paradigm might be good. So we decided maybe to use a broader approach would be more appropriate.

And so in the broader context it just seemed like the balance between the development of symptoms in any one at any age reflects a dynamic tension between the presence and the severity of a disease and the ability of the body to compensate. So in younger people in whom the compensatory mechanisms are fine, if they start getting an abnormality with the bladder, let’s say that now the bladder is going to start spasming or the urethral sphincter gets a little weaker what do they do? They drink less fluid so that they have less in their bladder at any time, and they void more often and that way they never get up to a volume in the bladder high enough to trigger a bladder spasm, or high enough volume so that the sphincter can’t hold it. And they get attuned to how their bladder is
filling so they pay a lot of attention to that. And they are much more on top of that than normal people would be, and they know where every bladder–every bathroom in town is. So they go to the bathroom frequently.

Now you can see that requires mental ability and insight and intact ________ reception and good motivation to care about it, and it takes a lot of effort to do it. But young people really worry about that and they don’t want to be embarrassed by this and they want to be in control of it, they don’t want to see a doctor and they don’t want an operation. So they do it and they remain dry until the disease severity becomes so severe that it tips the balance toward symptoms even in the face of normal compensatory mechanisms.

By contract, in older people if the compensatory mechanisms have been weakened either by the aging process itself or by disease or drugs then they don’t have the ability to keep the fulcrum balance and as a result disease can present at a much earlier stage. Two important correlates to all of this, number one disease often presents in older people than in younger people when it’s more amenable to treatment. Number two, this gives us a second target for our therapeutic interventions. We don’t have to focus everything on the bladder in order to make people better. And I told you about that older person who had that bursitis, I treated her bursitis of her hip and the incontinence went away. That’s her compensatory mechanism. So this is great. Think about all the ways that we can now see that incontinence in older people differs from younger people, and how we can take those lessons to formulate more efficacious therapeutic interventions.
So that then led me to this realization, that when I see people, when we setup a continence clinic at the Brigham in 1982, that was 28 years ago, a long time ago, but it was the first one in North America and as a result we had people from all over the country who came and of all ages and all the TWA stewardesses who had a contract that they would be seen here, the Boston Ballet came here, so I saw people of all ages. But what occurred to me was if I had two people and they both had urge incontinence and both of them leaked 5 times a day, in a young person 100% of that was due to the bladder spasms. By contrast in the older person much less of the problem was the bladder spasms, shown here in red, but it was impact on the severity, or the apparent severity was magnified by the superimposition of all these additional diseases and drugs and things, things that I could readily intervene on. And it meant that I was able to be more effective and treat more people who had “refractory urge incontinence” who were old than were young. So isn’t this interesting? The table is turned, it was easier to treat an older person with incontinence than younger if this theory is correct. And that then led us to design some trials to check this hypothesis.

So to review some reasons that treatment of incontinence may have failed in the past was because in older people the approach failed to consider the multiple causes of it and all the causes outside the urinary tract. And then they were targeting on the urinary tract alone, even then they were missing the boat because half the time the patient had more than one urinary tract cause and that wasn’t being addressed. And it went on and on, and I won’t bother you with the rest but the point is I think we’ve seen a lot of reasons why treatment had failed and based on that we designed a trial to take a geriatric approach to urge incontinence and here it is.
We looked at generic Oxybutynin, this costs 22 cents a tablet and you can divide it in half to get the
dose that we used. So for 10 cents a dose and 3 doses a day we are talking 30 cents a day as opposed
to the usual pills for incontinence that is $3 a day, so ten times cheaper, here is the study that we did.
We took 100 older patients with chronic urge incontinence who had detrusor overactivity, the
standard kind of person who would go into a trial. But here is what we did differently. We treated
the causes of the incontinence outside the urinary tract first, then we confirmed that it really was the
urinary tract that was still the problem and the bladder spasm at that. And then we titrated the drug
based on what we learned about the physiology of aging that the bladder contractility decreased with
age and some of these people had obstruction, etc., etc. We just took into account the normal
physiology that occurs with aging. And once we took this sequential geriatric step-wise approach
here is what we found.

Two-thirds of these people became totally dry. And far from being untreatable and far from being
less treatable than younger, this was the highest success rate that had ever been reported for
continence among incontinent people. So the hypothesis that we had and the theoretical substrate it
was based on was confirmed. Furthermore, it turned out that that subtype that we had found that the
kind of bladder that was a spasm but weak, it wasn’t as responsive as the other type but still half
those people, 50% with AHIC became completely dry. So our conclusion was that older people can
actually respond well to treatment of incontinence.

So that then just to reprise, the myths that we’ve now been able to look at informally, in detail over
20 years, first, incontinence was never normal with age, it was not normal if you were demented.
The cause of incontinence wasn’t a bladder that spasmed even among people who were demented. And it is treatable even in older people provided you realize the principles of geriatrics in your approach. Well that then led us to another realization. And it is that much of what we were finding in the bladder it seemed to me as I was reading the literature and talking with my colleagues around the country who were looking at other geriatric syndromes, much of what they were doing was the same. And Mary Tinetti and I were on a study section together, and I said, Mary, what you are doing and what I am doing are the exact same thing, but you are doing it to _______ incontinence. So it was pretty cool, the next thing I know she has a JAMA paper showing that incontinence _______ the same thing but there you have it.

So it occurred to me looking at it more broadly than just incontinence was that all these syndromes were largely very similar. And that perhaps geriatrics in general was just a single song sung in many different keys. I was singing in the key of incontinence, others were singing in the key of delirium or falls or syncope or depression, they are all the same. So let me show you. Here is what I just showed you about incontinence, 5 episodes of leaks a day, and somebody has got refractory detrusor overactivity. The young person it’s all due to the bladder, the old person it’s not. Okay? Here is in geriatrics in the key of memory impairment. Young person, old person, they both have Alzheimer’s disease, they both have lost 50% of their mental function, but in the young person, say the 60 year old who is otherwise healthy, on no drugs and has no diseases, 100% of that memory loss is because of the plaques and tangles of Alzheimer’s. By contrast the older person, some of it’s due to the plaques and tangles of Alzheimer’s but some of it is magnified by other diseases and drugs and things that they’ve got going on. It’s the same thing. Here it is in the key of syncope.
So in syncope traditionally we look at the heart, we look at the ______ reflux function, we look at orthostasis and all the things that it turns out that Lou Lipchitz has done some really interesting work in sympathy. And what he did was realize by looking at the old neurological literature that for the brain to stay awake and functioning you needed at least 3 ½ ccs of oxygen per 100 grams of tissue. And what he found was by the time you got to be 75 instead of having an average of 12 to 15 ccs of oxygen per 100, that you had less. And then if you were diabetic with less vascular supply, you had less and if you had anemia well then you could carry less oxygen, so you had less. And then if you had heart problems you perfused your brain less, so again _______. If you had COPD or lung disease you had less oxygen in addition. And you just keep adding them along the X axis and before you know it, our older person is perilously close to this precipice. And now you get some pneumonia and over he goes because that last molecule of oxygen he needed to go to his brain now is below the threshold.

So if you go in with a traditional approach to syncope and you say it’s all about the heart, and you do Holter monitors and whatever you are obviously going to miss the boat. And we know that 50% of people in America who come in to a US hospital with syncope are discharged even today with a diagnosis of syncope of unknown etiology. That’s not unknown here, it’s just that that’s not fitting the paradigm. As long as you say that the paradigm means that the heart had an arrhythmia or a ______ or symptom like that, well our patient didn’t have it. But here anyone in the room can see that we can figure out why this guy had syncope. So very similar.
So the implications seem to be that whatever disease you’ve got the severity is often magnified in older people by their comorbidity. Comorbidity is not that difficult to recognize or obscure that you have to be brilliant about, but the kinds of comorbidity that any primary care doctor can easily understand and detect and treat if they know that that’s actually the cause of this new symptom. It’s just that they don’t look at it that way because they look at that symptom and say if it’s syncope it must be the heart, if it’s incontinence it must be the bladder, and they don’t bother with these other things even though they could if they knew to do so.

And second, that because older people have more conditions, rather than being confounding or depressing this is actually the glory of geriatrics because the more conditions older people have the more opportunities we have to intervene. And though we can’t cure all of these things, if we can make even a 5 or 10% improvement in each of 10 things, we’ve made a huge impact in the aggregate on the person.

The third issue is that even if the condition an older person has is untreatable, like Alzheimer’s it doesn’t mean that the patient with that condition is untreatable. And I just showed you, young people and old people with incontinence or Alzheimer’s for whom they had refractory detrusor overactivity or bone damage that that doesn’t mean you couldn’t get rid of all the superimposed things in those yellow boxes and make the patient much better even though that disease wasn’t.

And fourth, that steps, a step-wise sequential approach to treating an older person will allow the efficacy of a specific organ targeted therapy to work better. If we can clear up all those other things
that I showed depicted in those yellow bars, then once we get to the red part, whether that’s a bladder spasm or the brain or the heart or whatever, the different treatment works better. And in the bladder I showed the proof of that.

And finally, since the approach is similar to most geriatric conditions no matter what the condition is, it seems like addressing one would provide benefits far beyond just taking care of the incontinence, because after all when I took care of the incontinence I cleared the delirium and the polypharmacy and the immobility and all the rest of those things that were going on, that’s going to make the person better in general, and in addition to that independent of their incontinence. So it seemed to us that maybe there could be a unified approach that regardless of the condition from which the patient suffered that if you detected and addressed issues that were common to all of them we could treat patients better no matter which way we came at the problem. That is addressing the diseases of all other organ systems, even ones that on the surface didn’t seem to have any relationship to the symptom the patient had. All of the drugs that were inappropriate, improving function and improving sensory impairment, and then also making sure that the next step were consonant with the patient’s goal, because after we did the first things here most of the patients were actually better enough that they actually were very happy where they were and they didn’t want anything further. So actually we could stop and declare victory.

But then if they wanted more, having cleared up all the rest of those confounding conditions we now were in a much better position to treat the specific thing that they were coming in with and had much better chance of success. And this then laid the groundwork for a different approach to trying to help
raise the floor of care for primary care doctors to be able to better help older people. And that was a model called Grogan Care, which we are still waiting to try to be able to implement.

But that now puts us in a good position to come back to our case. You remember that she was an 88 year old woman with Parkinson’s disease and she had fallen and had a fracture. And she was confused and treated with this antipsychotic and became incontinent and she was a wreck. But we see now in retrospect she had every one of these risk factors and these contributing factors that cause incontinence, even though you’ll notice we didn’t put a tube in her bladder, we haven’t done urodynamic testing, we don’t know what’s going on in her bladder but we know that all these other things alone are enough to make her have trouble remaining continent. So all we did was just treat each of them. This is not upper level science. Any doctor in the world can do what we did. You don’t have to know about incontinence. We decompressed the bladder, we disimpacted her feces, we got rid of that extra fluid overload that she had from her heart failure and we stopped that drug she was on, that Haldol because it was making her Parkinson’s worse. It’s not worth going into, but somebody with Parkinson’s shouldn’t be on that drug because it exacerbates the Parkinson’s, and the Parkinson’s in turn made her more immobile and more stiff.

And so we got rid of all that, she got much better. Her Parkinson’s remitted, her heart failure resolved, her bowels became regulated and mobility improved, and her incontinence improved. She got 80% better. And we never touched the bladder, 80% better. Now it turns out for her that wasn’t good enough because what she really wanted to do was attend her grandson’s graduation and was in a position where carrying around a lot of diapers and travelling it wasn’t really going to work for
her. So we said you want more, we’ll give you more. So we took a history, now we could focus on the bladder. And at that point we figured out that the cause was a bladder that spasmed, this is just a cartoon to say that a behavioral approach to urge incontinence is really the cornerstone of therapy. And we taught her this, and she became completely dry and able to attend her grandson’s graduation from college. And for the remaining 8 years of her life she remained completely continent.

So here is the last part of the talk. We talked about going from the bed, the beside to the bench and back to the bed, what about the policy? Well, the simplified approach that came out of this empirical data was actually useful for CMS which runs Medicare. And it formed the approach that was not able to be developed for nursing home patients because up to then it was felt nothing could be done for nursing home patients because of the problems with the bladder and you needed a urologist and you needed a uro exam and testing and it cost $1,000 and it wasn’t available and you needed an ambulance to transfer them to the hospital, it was hopeless. But with this – this now allowed us to come up with a much simpler approach and that became the basis of the minimum data set, and that’s now been adopted by 25 countries and that’s been a way that policy was – we were able to make a contribution to the policy. So the American ARC, the health research and quality branch of the government which is analogous to NIH but works on improving health care used this to develop national guidelines for incontinence that are now suggested for all adults who are incontinent, not just older people. And then it was also adopted by the World Health Organization so that it could be useful in countries that don’t have our kind of sophisticated technology and dollars. And as I said, we are now trying to use it to develop new approaches to geriatrics in general.
So that brings me to my last two slides. That perhaps Sir Francis Bacon got it right centuries ago. He said perhaps the greatest obstacle to progress is in fact the belief that no progress is possible. And then of course the goal that we all have, whether we are basic scientists or clinical scientists or health policy or geriatricians is to cure sometimes, to relieve often but to comfort always. Thank you so much for your attention. I’d be happy to take questions.