

1 from early phase trials, or are some of these from
2 actual patients, and what are -- particularly, I ask
3 in respect to data we heard yesterday where blood
4 levels in sick patients, or in patients at least, were
5 actually higher than in the Phase I and II studies, or
6 Phase I studies? So, when we see 3.6 or 4.52 on day
7 ten of multi-dose as a Cmax, what is that -- is that
a from patients, and, if not, do you have data from
9 patients?

10 DR. SACKS: The results that I've
11 presented, as far as I'm aware, are from Phase I and
12 II studies, they are not from clinical trials. That's
13 being concurred with.

14 DR. MURRAY: So, they are not data from
15 lots of real live patients?

16 DR. SACKS: No.

17 ACTING CHAIRMAN RELLER: Dr. Soper.

18 DR. SOPER: Well, I can't say that I'm
19 impressed with QTC intervals or whatever they are,
20 which is a questionable hint of a possible significant
21 measurement, but I am impressed about this 33-year old
22 male who, an interesting use of words, tolerated the
23 400 milligram infusion to arrest 11 minutes later, and
24 this was felt to be a vasovagal reaction. Does this
25 imply that this isn't related to the drug, and can you

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1 expand on this adverse cardiac output? It's on, I
2 think it's your No. 16.

3 DR. KUBICE: I'm Dagmar Kubice, I'm a
4 Clinical Pharmacologist from Bayer.

5 I happened to be on the ward when this
6 happened, actually I was the treating physician, so
7 what I can tell you is that this episode happened
8 right after blood was withdrawn from an IV cannula,
9 and that's something like a drop in heart rate that
10 we'll see quite often afterwards as a vagal episode.
11 But, this was very extreme.

12 DR. SOPER: So, this individual has a line
13 in his arm, you are putting a needle into something
14 which doesn't stick his skin and drawing out 10 ccs of
15 blood, and you think that that is a vasovagal reaction
16 in this case?

17 DR. KUBICE: Well, you see that, and I
18 mean if you talk to other Phase I units, I mean, this,
19 thank God it's not very often, but it happens, and
20 it's when you are manipulating an IV cannula. That's
21 a very strong vagal episode.

22 DR. DiMARCO: John DiMarco from Virginia.
23 I'm an electrophysiologist, and I'd just like to
24 comment on this, that since we started doing tilt
25 tables in people with neurocardiac or vasovagal

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1 syncope, or whatever you want to term it, it's really
2 remarkable what you can see. I think the record at
3 our lab is 57 seconds of asystole in somebody with
4 recurrent syncope. And, in it's in somebody with a
5 normal heart, I'm sure Jeremy or Joel have, you know,
6 similar heart harrowing experiences, and yet these
7 people recover.

a The fact that they do get -- because they
9 are in that situation they do get some CPR often, they
10 do come back with an idioventricular rhythm, then a
11 junctional rhythm, and that's just what we call
12 neurocardiac syncope.

13 DR. RUSKIN: I would agree. I listened to
14 this without the slightest bit of concern. It's a
15 classic vasovagal reaction, and we see it in the cath
16 lab and electrophysiology lab every day, just
17 manipulating catheters with indwelling lines. So, I
18 would have no concern about it being a drug-related
19 proarrhythmic effect of any kind.

20 ACTING CHAIRMAN RELLER: Dr. Parsonnet.

21 DR. PARSONNET: I was just curious about
22 whether you had any more information about the
23 dizziness that seemed to be more apparent in the
24 sponsor's product than in the comparator, and whether
25 that was vertigo or whether it was lightheadedness.

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1 DR. SACKS: I, myself, can't give a whole
2 lot of clarity on that. It wasn't listed as vertigo,
3 it was listed as dizziness, and I think that's
4 probably the limit of my knowledge of the data.
5 Perhaps, Bayer may have some additional comments on
6 that.

7 DR. HOLLISTER: Alan Hollister. You know,
a one of the protocols that we conducted was the
9 sinusitis, where we were doing antral taps, and I
10 don't know about you, but I faint when somebody sticks
11 a needle through my bone into my nasal sinus, too, and
12 most of the episodes of dizziness were due -- occurred
13 around those times or with blood drawing, but not all.

14 ACTING CHAIRMAN RELLER: Barbara.

15 DR. MURRAY: So, you don't think this is
16 that frequently seen with other fluoroquinolones, CNS
17 sort of symptomatology? I mean, you think this was
18 episodic due to a particular intervention, the
19 dizziness, or did you think that there was -- not that
20 it's a significant drawback, but it certainly, with
21 other fluoroquinolones there is that --

22 DR. SACKS: Correct. I think the answer
23 in part is the fact that even the sinusitis studies
24 were controlled, so, in fact, my sense is that there
25 was an increased signal and it probably does relate to

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1 the drugs. It did not come across from viewing the
2 data that this was directly an arrhythmic effect, but
3 certainly it did seem to be drug attributed.

4 DR. HOLLISTER: In the all adverse drug
5 reaction group, there were uncontrolled sinusitis
6 studies, that is, ones that the subjects only received
7 the moxifloxacin. So, we don't have the comparative
a frequency there.

9 But, I agree with you that there are
10 multiple causes of dizziness, and we certainly cannot
11 rule out that this may be a fluoroquinolone effect.

12 ACTING CHAIRMAN RELER: Dr. Temple.

13 DR. TEMPLE: Just to come back to the QT,
14 I was left slightly confused by one of the
15 discussions. Dr. Platt, I think, was asking whether
16 the dose had been pushed enough to find out what the
17 QT effect would be at relevant concentrations, because
18 in the data relating QT prolongation to concentration
19 relatively few people were up where you thought they
20 ought to be.

21 Did I understand Dr. Morganroth and the
22 company to be saying that their conclusion about what
23 the true QT prolongation effect is comes from patients
24 who were studied, several hundred of them anyway, at
25 whatever their concentration -- at whatever their --

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1 at approximately their Cmax, so whatever that was was
2 what they reach, and that that was the nature of, that
3 was the source of the six millisecond average
4 response? I mean, is there a contradiction between
5 those two, and is it resolved?

6 DR. PLATT: It sounds like a contradiction
7 to me. I don't understand how people on therapy can
8 have levels that are substantially lower than the
9 Phase I normal volunteers.

10 DR. MORGANROTH: This is Joel Morganroth.
11 I think there isn't a controversy. I think that Bob
12 is right in the sense if you take single doses in
13 healthy volunteers in a Phase I unit, what I don't
14 think Bayer did is they pushed single doses high
15 enough to reach steady state 400 milligram a day
16 plasma concentrations steady state. Okay, so, well,
17 I'll let them comment on the plasma levels, I'll just
18 address the QT issue.

19 What I said before was, if you take
20 whatever the relevant concentration is in patients at
21 400 milligrams a day in Phase III large clinical
22 trials, in which they didn't measure any
23 concentrations so we don't know what those
24 concentrations are, but at that dose you get a mean of
25 six milliseconds. And, when you compare big Phase III

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1 trials with other drugs that have, let's say, 20
2 milliseconds in their clinical dose, the 20
3 milliseconds acts seemingly badly in marketing
4 experience, if you will, where the smaller durations
5 we don't have any data to suggest that they do or
6 don't, frankly. There doesn't appear to be, from what
7 we heard at the last presentation, that they do.

8 But, I'm not addressing plasma
9 concentrations, so the real question, or an additional
10 question, or another question is, how much can you
11 rely on plasma concentrations to reflect QTc changes
12 and what they did with single doses versus multiple
13 doses. And, did they give enough of a multiple dose
14 accelerated, you know, dosing schedule to see what the
15 QT could do at 3x dose, 5x dose, et cetera, I don't
16 think they have that data.

17 But, I can't answer the concentration
18 issues, maybe Dr. Hollister can.

19 DR. HOLLISTER: We were very interested in
20 just this problem, and do you have the slide number,
21 carousel five, slide 61. In partial answer to your
22 question, I took data from our crossover studies,
23 where patients were treated with a single dose of
24 moxifloxacin anywhere from one week to six weeks
25 apart, in terms of wash out, and measured the change

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1 in QT interval that they had with their first exposure
2 and with their second exposure.

3 And, this is a plot that we know Dr.
4 Temple likes. Okay, change in QT after the first and
5 second exposure to moxifloxacin, the first exposure is
6 plotted on the X axis, the second exposure on the Y
7 axis, and although this slide is kind of small and
8 doesn't project very well these are the axes here.

9 So, for instance, this person out here,
10 first exposure to moxifloxacin had an increase in the
11 corrected QT interval of 89 milliseconds. The second
12 time, either one to six weeks later, had a decrease of
13 11 milliseconds. So, this, you know, kind of supports
14 the whole concept that there is a great deal of
15 intrinsic variability in the measurement, and what we
16 are doing is, we are seeing a little bit of effect on
17 top of that intrinsic variability.

18 If you look at the clustering of the dots,
19 you know, ideally if there were no relationship
20 between the first and the second exposure, in terms of
21 the change in QT, you would have a scattergram that
22 would be essentially a circle, but, in fact, that
23 circle is displaced up this way about six
24 milliseconds, I think.

25 DR. PLATT: That all sounds fine. It

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1 seems to me, though, that the clinical data is giving
2 a prolongation that is exactly what you saw with the
3 single dose of 200 milligrams on Dr. Sacks' slide, and
4 so either dose doesn't make -- serum concentration
5 doesn't make a difference, or the mean concentration
6 in your clinical trial group who had paired ECGs was
7 on the order of what your volunteer population
8 achieved with a single dose of 200 milligrams.

9 And so, that just sort of takes me back to
10 Dr. Ruskin's question, do you have enough data on the
11 clinically relevant concentrations that will be
12 achieved when you leave the clinical trial
13 environment?

14 DR. HOLLISTER: Well, I think the key is,
15 the clinical trials were clinically successful, okay,
16 at whatever concentration we achieved in those
17 clinical trials. That concentration resulted in a QT
18 change of about six milliseconds.

19 DR. PLATT: Fair enough. Hard to know
20 where that will go, and if you believe Phase I data,
21 it makes it just hard to understand.

22 I guess the other thing to keep in mind
23 is, if there's that upward tilt, and some people
24 achieve those higher concentrations, a very much
25 larger fraction of those people will have more than 60

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1 millisecond prolongations than two and a half percent.
2 It might be 20 percent or 30 percent who have 60
3 millisecond prolongations if, in fact, the average is
4 on the order of ten or 20.

5 DR. HOLLISTER: Well, I agree, and I think
6 that's sort of the essence of the issue, is, you know,
7 if someone achieves a very high blood concentration of
8 a drug, and that's why we tried to emphasize that, you
9 know, here's a drug that doesn't have any interactions
10 that result in drug accumulation, here's a drug that
11 doesn't have any elimination issues that result in
12 drug accumulation. That, I think, is how we factor
13 the pharmacokinetics of this drug into the risk
14 equation.

15 DR. RUSKIN: Just a point of clarification
16 in reference to Dr. Platt's comment. I didn't -- if I
17 implied that I didn't think the data from the clinical
18 trials was relevant, I certainly didn't mean to do so.
19 I think that that is the only relevant data, and it's
20 what we have to base our assessment on.

21 What I did say was that in the higher risk
22 subsets, which are very hard to study, people with
23 congenital long QT syndrome, people with
24 phenotypically normal EKGs, and genetic abnormalities
25 of K channel metabolism, people on concomitant Class

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1 3 anti-arrhythmic agents, those are the ones that we
2 worry about, and that's the small subset in whom we
3 have no data, and that was really the only point I was
4 trying to make.

5 I think the clinical data that you have is
6 very important, and it probably applies to 99 percent
of the patients who are going to be treated with the
8 drug.

9 DR. SACKS: I was just asked to project
10 this back-up slide, which shows very small numbers of
11 patients, it's the information that we have available,
12 looking at much higher serum concentrations based a
13 small study of intravenous infusions at different
14 infusion rates. And, perhaps, that will give you some
15 idea of the very small amount of data that we do have
16 to show what happens when you give higher doses to the
17 change in the QTc interval on the Y axis.

18 ACTING CHAIRMAN RELLER: Dr. Temple.

19 DR. TEMPLE: Actually, in a carefully --
20 very, very carefully controlled environment, you
21 perhaps, could study the interaction of drugs that
22 prolong the QT interval that are known to in your
23 drug. You know, people have -- even people who work
24 for the FDA have carried out studies of interfering
25 with terfenadine metabolism and noting what happened,

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1 which was impressive. That might be a piece of
2 information that would be useful.

3 To my knowledge, Jeremy, I don't know that
4 there is anything quite like that. People assume that
5 if you add this drug sotalol it will be a problem, but
6 it may be they are working the same --

7 UNIDENTIFIED SPEAKER: It was in dogs.

8 DR. TEMPLE: Is it? Well, and maybe
9 that's a clue, but you can form hypotheses in which if
10 you've already blocked the system you don't do much by
11 adding a rather poor blocker to a big blocker. So,
12 you don't really know until you look, but maybe the
13 dog models have told the answer to that, I don't know.

14 DR. RUSKIN: Unfortunately, your
15 hypothesis has not been borne out by clinical
16 experience, and that is that the effects of most of
17 these agents appear to be additive.

18 But, you are right, it's something that
19 could be tested on an in-patient basis if someone
20 wanted to do the trial. There's certainly a lot of
21 people getting sotalol initiated on an in-patient
22 basis. So, it's conceivable that one could do that,
23 but absent those data I think one would have to be
24 very cautious about labeling.

25 DR. PLATT: One last question, Dr. Sacks,

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1 how do you interpret the hypokalemia data?

2 DR. SACKS: I think the best I can do is
3 just share it with you. I think there's definitely a
4 difference in the incidence of significant
5 prolongations inpatients who are hypokalemic compared
6 to normokalemic, and it's a concern that I raise, a
7 genuine concern that I do raise.

8 ACTING CHAIRMAN RELLER: Dr. Battinelli.

9 DR. BATTINELLI: I just wanted to ask Dr.
10 Ruskin a question, and then maybe make one
11 observation, and that is that the majority of the
12 people that are going to be prescribing this
13 antibiotic do not have Dr. Ruskin and some of the
14 others' background. And, I don't think Dr. Ruskin is
15 going to be prescribing this a lot in his office,
16 maybe he will based on what he learned here.

17 And so, as a clinician who is not going to
18 look at the QTc each time the prescription is going to
19 be written, and whose patients will be some of Dr.
20 Ruskin's and some of others on some of these other
21 agents, I'm also very concerned at least about how the
22 label is currently being asked to be arranged.

23 The other part is that Dr. Ruskin has been
24 referring to the 1A and 3 anti-arrhythmics, but I seem
25 just to infer from his comments about cisapride that

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1 there's just as much concern with that drug as with
2 the anti-arrhythmics.

3 DR. RUSKIN: Well, the second question is
4 either than the first, and I would agree that I would
5 have concern about any drug concomitant use of this
6 agent or any other Ikr blocker with any other drug
7 that belongs in QT interval, absent convincing data
8 that it was safe.

9 The first question is much harder to ask,
10 and it comes up in reference to anti-arrhythmics and
11 all sorts of other agents that have far more profound
12 effects than this drug, and that is how does one
13 factor in the way in which drugs will ultimately be
14 used by the medical community, and I certainly don't
15 have an answer to that. I think that's the \$64.00
16 question.

17 The data on this drug would appear to be
18 reasonably comforting with regard to the fact that
19 there are no signals, and most importantly that there
20 are no interactions with the cyp 450 system, so that
21 it's unlikely that there will be a lot of catastrophes
22 from metabolic interactions with drugs that interfere
23 with the metabolism and excretion of the drug.

24 If that were present, I think the concern
25 would be much, much higher, but my major concerns

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1 relate to precisely what you described, and that is
2 use with other drugs that prolong the QT, and then
3 that very rare undetected individual, who either has
4 the long QT syndrome at baseline, or what we now know
5 to be a phenotypically normal EKG, but a genetic
6 abnormality of K channels that make them particularly
7 susceptible. And, that ends up being some sort of a
8 risk benefit assessment, and how you do that is not
9 easy in this situation. The drug appears to be
10 effective. I initially thought that it looked pretty
11 good again pen resistant Strep. pneumoniae. I thought
12 that that would be, perhaps, a major factor in its
13 favor, and I was impressed with the mortality data,
14 although I must admit I'm a bit confused about that
15 now that I've seen Dr. Sacks' analysis.

16 So, I think it's very hard to know exactly
17 how you balance these things, but I can tell you that
18 if we were to eliminate all drugs that affect the QT
19 interval we would have a profound impact on our
20 pharmacologic armamentariumincardiology, psychiatry,
21 infectious disease and most other areas. The more we
22 look, the more drugs we find have these effects, and
23 each drug that comes up gets held to a higher and
24 higher standard. It gets more and more difficult to
25 evaluate and to make these assessments.

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1 So, the bottom line is, I don't have a
2 simple answer for you, and you can't control practice,
3 you just have to label things as intelligently as
4 possible, and I think do very careful post marking
5 surveillance. I should add that at least I know Dr.
6 Morganroth, and I'm aware of quite a few cases of
7 Torsade with sparfloxacin that have been reported in
8 Europe. So, I know you've got one case here, but
9 there are a lot more than that that are now reported
10 outside this country, and I think very, very careful
11 post marking surveillance would be critical here.

12 ACTING CHAIRMAN RELLER: Dr. Ruskin,
13 relative to the possible additive component with
14 cisapride, the class 1A3 anti-arrhythmic agents,
15 compared with those added compounds and the rare
16 congenital hereditary aberrations where does
17 hypokalemia figure in, which would be encountered much
18 more commonly than at least some of the others, in
19 terms of --

20 DR. RUSKIN: Well, it's probably a very
21 important factor, along with bradycardia. Certainly,
22 we know that Ikr blockers, for example, Ikr is really
23 most active at slow heart rates, and bradycardia is a
24 very important predisposing factor to Torsade.

25 One of the ways of preventing Torsade,

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1 even with a very potent Ikr blocker, is just to drive
2 the heart rate up.

3 Potassium is in a similar category, and
4 that is significant hypokalemia is a very powerful
5 stimulus to Torsade in the setting of a drug which
6 blocks Ikr. So, I think it is a major issue.

7 How to quantify it, how to put it into the
8 equation, is something I can't even begin to figure
9 out how to do. It certainly ought to be in labeling,
10 but how that translates into clinical practice is a
11 very difficult issue.

12 ACTING CHAIRMAN RELLER: To follow up on
13 that, and this would be addressed to you, Dr.
14 Hollister and Dr. Morganroth, any or all, in listening
15 to the discussions I have the impression that it's
16 very difficult, it, perhaps, may be easier to
17 delineate what's real, that is related to the drug
18 versus what is risk, but you, I believe, suggested
19 that though the risk may be difficult to quantitate
20 that the comparator gives possibly important
21 information also.

22 So, in that light, is there an important
23 difference in the QTc measurements with this agent and
24 one of the commonly used comparators, the six
25 milliseconds and the two milliseconds for

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1 clarithromycin, and fuse that question with the
2 experience here on the QTc changes with this agent
3 versus the comparator in the presence of normal
4 kalemia and hypokalemia, given what you said about
5 hypokalemia?

6 DR. RUSKIN: That's a long question.

7 ACTING CHAIRMAN RELLER: But, you see
8 where I'm going, or asking, is there a difference
9 between these agents, and does hypokalemia bring it
10 out, and does it bring it up to where it's something
11 that's important?

12 DR. RUSKIN: I think the simplest answer
13 I can give you is that the numbers are too small to
14 answer that question. I just don't think you know.
15 I think you know -- all you know is that there is some
16 theoretical risk here that you can't get your arms
17 around. You know that clearly there under some
18 circumstances in some small subsets of patients, there
19 will be some risk for trouble with this agent. Nobody
20 can tell you what that incidence will be, except that
21 it will be low. And, one has to balance what is
22 likely a very low risk against the potential benefits
23 of the agent.

24 With regard to comparators, it would
25 appear that this looks better than sparfloxacin and

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1 probably not quite as good as most of the comparators,
2 although certainly the differences are rather small,
3 and I think that's about as far as you can take it.
4 I think that those numbers are interesting, but the
5 numbers are so small that I can't make any useful
6 conclusions from them.

7 ACTING CHAIRMAN RELLER: The reason I'm
8 asking these specific questions is, in terms of
9 fairness what constraints, restrictions, warnings,
10 things that are pointed out of having them relative to
11 the possible or probably relative risk, that we don't
12 know what it is.

13 DR. RUSKIN: Well, some of your responses
14 I think, or some of what you do is based on data and
15 some of it is based on what you know about a drug
16 being an Ikr blocker, and you have to do the best with
17 both of those. And, in this situation, from my
18 perspective, it would involve contraindicating the
19 drug with concomitant agents that prolong the QT
20 interval, contraindicating its use in people with
21 known QT prolongation, and making very clear
22 statements about the additive risks of hypokalemia and
23 bradycardia and other factors which predispose to
24 Torsade in the setting of an Ikr blocker, which this
25 is. I think that's all you know.

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1 There is no way to take it a lot further
2 than that, that I'm aware of. And, one could argue
3 that that should be applied to several of the drugs
4 that are already out there.

5 ACTING CHAIRMAN RZLLER: Thank you, that's
6 very helpful.

7 Dr. Temple.

8 DR. TEMPLE: I thought you were also
9 posing the question of whether it's fair to discover
10 something and label a recent drug with harsh labeling
11 restrictions when there are some old drugs around that
12 look like they might be just as much of a problem and
13 they are not labeled yet. This comes up all the time.
14 It's a concomitant of learning things, and as a
15 general matter we have taken the position that we need
16 to label the new drug the way it is properly labeled,
17 and we'll get back to the others and try to change
18 them, too.

19 But, people observe to us that quinidine,
20 a probably more dangerous anti-arrhythmic than many of
21 the newer ones, had relatively light weight labeling
22 compared to some of the newer drugs, and we eventually
23 went back and heavied it up. But, that comes up all
24 the time, you sort of have to do what you have to do,
25 and then go back and get them, perhaps, with a greater

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1 urgency than we've always done it.

2 ACTING CHAIRMAN RELLER: It's the
3 intention of question four, I believe, to make sure
4 that we get a sense from the voting members of the
5 committee to be transmitted for your final
6 consideration.

7 At this point, I would like to turn to Dr.
8 Mark Goldberger, to focus things for us so that we can
9 address expeditiously the questions, while we have a
10 full quorum.

11 DR. GOLDBERGER: Thank you, and we have
12 posed four questions for the panel.

13 The first, has moxifloxacin been shown to
14 be safe and effective for the treatment of
15 uncomplicated skin and skin structure infections,
16 community acquired pneumonia, acute exacerbation of
17 chronic bronchitis, and acute maxillary cellulitis.
18 We've listed the indications separately, first of all,
19 because one needs to obviously look at the efficacy
20 for each indication separately, and also because it is
21 reasonable at times to consider looking at safety in
22 the light of the amount of efficacy achieved and the
23 indication in question.

24 If the answer is no for one or more
25 indications, what additional information would be

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1 required? If the answer is yes for any or all of the
2 indications, are there any caveats regarding its use
3 that you would recommend be included in the product
4 labeling?

5 As part of your discussion of the
6 community acquired pneumonia indication, and I would
7 also add to this the sinusitis indication, please
8 address the applicant's request that the indications
9 and usage include PRSP. Should you recommend
10 inclusion of PRSP, should any mention also be made of
11 PISP in this section? Obviously, this is an issue
12 that was addressed in part yesterday with a different
13 product as well.

14 If the answer to question one is yes for
15 one or more indications, do you believe that the
16 labeling proposed by the firm regarding the
17 prolongation of the QT interval produced by
18 moxifloxacin is adequate? If not, what modifications
19 would you suggest? And, again, we've heard a lot of
20 comments about this already, a variety of concerns.
21 It's important to do the best you can to be as
22 specific as you can with this regard for our further
23 discussions with the company. Obviously, this is the
24 type of information that could ultimately affect other
25 products as well, but as Dr. Temple said a moment ago,

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1 a journey of a 1,000 miles basically begins with the
2 first step, and this is, you know, probably the first
3 place where we have sufficient data and the
4 opportunity to get expert opinion about this issue.

5 If moxifloxacin is approved, do you have
6 any recommendations regarding Phase IV studies or data
7 collection that the applicant should be requested to
8 perform? And, this can include any variety of issues,
9 including looking at alternative doses in some of the
10 indications if you believe that might be reasonable,
11 additional types of surveillance data in terms of
12 resistance, other issues in terms of looking at the QT
13 prolongation, or other, for instance, safety issues.

14 And finally, the last question, and I
15 guess we are focusing more on this last question for
16 Dr. Ruskin and Dr. Morganroth, although obviously
17 anyone who likes can participate, do you have any
18 recommendations regarding the parameters, both
19 qualitative and quantitative, that may be most useful
20 in assessing the significance of QT prolongation
21 caused by anti-infective products?

22 Now, what particularly obviously is a
23 starting point, trying to distinguish basically
24 cardiac and non-cardiac, and, obviously, anti-
25 infective or non-cardiac drugs. This could obviously

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1 have just been listed that way, but we don't feel it's
2 appropriate to step over into other people's
3 territory, we have enough problems with the anti-
4 infective products. But, we would appreciate, we have
5 gotten some advice, we would appreciate, for instance,
6 whether there are certain screening tests early in
7 development that might be very helpful in determining
8 how much other data ought to be collected during the
9 Phase III studies, or whether, regardless of early
10 screening tests, a certain amount of EKG data should
11 be collected on all drugs, on certain classes, et
12 cetera. Whatever advice, and, again, you know, as
13 specific as you are able to make it, would be very
14 helpful. This would obviously apply both to new
15 products and potentially to getting additional
16 information on products that are already in the
17 marketplace.

18 Thank you.

19 ACTING CHAIRMAN RELLER: In considering
20 these questions, since the safety presentations and
21 the discussion across all indications, I think it may
22 be most efficient to address the efficacy components
23 by indication and then to address the safety issues,
24 because they are concentrated on questions two, three
25 and four.

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1 We are going to vote. We can discuss, if
2 necessary, the members should not feel compelled to
3 comment when something has already been stated, so
4 what I would like to ask in sequence for the four
5 requested indications, and we recognize that this is
6 a perspective of the advisory committee presented to
7 FDA for consideration.

8 The first question is, has moxifloxacin
9 been shown to be effective for the treatment of
10 uncomplicated skin and skin structure infections?

11 Dr. O'Fallon.

12 DR. O'FALLON: Yes, I thought, for all
13 four.

14 ACTING CHAIRMAN RELLER: And, actually,
15 you've made a further refinement. Let's have you vote
16 on all the components all at one time, not as a
17 package, but individually, and if there be -- Keith?

18 DR. RODVOLD: If I understand you, I'm
19 voting on all four, but one by one?

20 ACTING CHAIRMAN RELLER: If you think that
21 it's been shown to be effective for all four, say so.
22 If there's something for which you think it has not
23 been sufficiently -- there are sufficient data, point
24 that out, so that Rhonda Stover, our Executive
25 Secretary, can take a composite vote and break it down

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1 into the individual indications.

2 DR. RODVOLD: For all four indications, I
3 think the data proves that it's safe and effective.

4 ACTING CHAIRMAN RELLER: Efficacy.

5 Yes, Dr. Christie, your vote on efficacy
6 for these four indications.

7 DR. CHRISTIE-SAMUELS: For efficacy, for
8 uncomplicated skin and skin structure infections, the
9 answer is yes. For community acquired pneumonia the
10 answer is yes. However, I am not convinced that the
11 data shows that there is efficacy for bacteremic
12 pneumonia, nor am I convinced that the data is
13 efficacious for patients who have drug resistant
14 Strep. pneumo. I think the numbers were very small,
15 and I think six to seven percent is probably not
16 convincing for me.

17 For acute exacerbation of chronic
18 bronchitis, the answer is yes for efficacy. For acute
19 maxillary sinusitis the answer is yes for efficacy.
20 However, again, back to drug resistant strains, the
21 data presented by the drug manufacturers, I think that
22 might not be very convincing also for drug resistant
23 Strep. pneumo.

24 Thank you.

25 ACTING CHAIRMAN RELLER: Help refine, we

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1 will come back to Dr. Christie, because we are going
2 to address this in 1B, the issue of resistant and
3 intermediate strains, in terms of susceptibility to
4 penicillin, so that we will take your comments, keep
5 them separate and go on for the general indication
6 without regard to the subcomponents.

7 DR. CHRISTIE-SAMUELS: In general, the
8 answer would be yes for all four.

9 ACTING CHAIRMAN RELLER: The specific
10 indications, but without regard to the subcomponents
11 of a particular organism.

12 DR. CHRISTIE-SAMUELS: Without regard to
13 bacteremic pneumonia or drug resistant isolates.

14 ACTING CHAIRMAN RELLER: Dr. Soper.

15 DR. SOPER: Yes, for all four.

16 ACTING CHAIRMAN RELLER: Bob?

17 DR. DANNER: Yes, for all four.

18 ACTING CHAIRMAN RELLER: Yes, all four.

19 DR. PARSONNET: Yes, for all four.

20 DR. ARCHER: Yes, for all four.

21 DR. MORGANROTH: Yes, for all four.

22 DR. NORDEN: Yes, for all four.

23 ACTING CHAIRMAN RELLER: Thank you.

24 Now, we will tackle head on, and also in
25 relation to the extensive discussions undertaken

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1 yesterday of what our recommendations are to the
2 agency regarding penicillin-resistant Streptococcus
3 pneumoniae and penicillin intermediate Streptococcus
4 pneumoniae.

5 Dr. Goldberger, would you like for us to
6 handle those individually or together?

7 DR. GOLDBERGER: The penicillin resistant
8 Strep. Pneumoniae?

9 ACTING CHAIRMAN RELLER: Those strains
10 that have MICs above -- .125 or above to penicillin.

11 DR. GOLDBERGER: I suppose depending on
12 what the committee thinks, you may want to just
13 include them all together. I will leave that to your
14 discretion, and to what the comments sound like.

15 ACTING CHAIRMAN RELLER: All right, we
16 understand.

17 Dr. O'Fallon. Do you want me to start on
18 the left side this time? That's all right, that's
19 what we'll do.

20 Dr. Norden, did you vote on the last one?

21 DR. NORDEN: Oh, yeah.

22 ACTING CHAIRMAN RELLER: I thought so.
23 Okay.

24 DR. NORDEN: I always vote.

25 I guess I'm with Dr. Christie on this, but

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1 it bothers me because I think I'm not sure we're being
2 consistent from yesterday. If you total it up
3 there, the sinusitis and pneumonia cases based on Dr.
4 Meyerhoff's review, there are 14 isolates, as I see
5 it, which are resistant. I mean, my answer is very
6 simple about intermediate, it shouldn't be included in
7 any label, just as we did yesterday, but for the
8 resistant there are 14 in the sinusitis and pneumonia,
9 and there were 12 successes. And, my recollection is
10 that yesterday we didn't have that many more resistant
11 isolates either, although they were all in pneumonia.
12 I am not convinced by this, and I'm going to vote no,
13 but I do think I'm not sure I'm being very consistent.

14 DR. GOLDBERGER: There was a question we
15 actually asked yesterday that no one commented on,
16 probably because it was by that point 5:30, and that
17 was about in future studies whether organisms from
18 different body sites could be combined for
19 information. No. one touched upon that. One of the
20 differences between yesterday and today, as you
21 pointed out, all the isolates were from community
22 acquired pneumonia. Here they are from community
23 acquired pneumonia and sinusitis, leaving aside the
24 one from bronchitis. The question is, is can they be
25 reasonably combined?

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1 There may also be differences in the total
2 body of pneumococcal experience with the product,
3 which we haven't spent a huge amount of time talking
4 about, which I think are probably different.

5 ACTING CHAIRMAN RELLER: Carl, just to
6 recap the numbers, for those community acquired
7 pneumococcal pneumonias, for which we are absolutely
8 certain of the etiology, in the database that we are
9 talking about today there are eight such patients in
10 the highly resistant, 17 in the moderately resistant,
11 versus the comparative numbers for yesterday's
12 discussion of 14 and 44, so, roughly, the database is
13 about a third as big for bacteremic pneumococcal
14 pneumonia.

15 DR. NORDEN: Not bacteremic, just
16 pneumococcal pneumonia.

17 ACTING CHAIRMAN RELLER: I'm talking about
18 bacteremic.

19 DR. MURRAY: But, the bacteremias, none of
20 them were penicillin resistant. There were about ten
21 bacteremias, from what -- ten or 11, but she presented
22 data on the seven, on the efficacy in bacteremia from
23 seven of ten. But, if you are penicillin resistant,
24 none of those were thought to be bacteremic.

25 So, I agree, we didn't have the body of

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1 pneumococcal experience, in my opinion, we didn't have
2 the 218 cases, we didn't have the number of penicillin
3 resistant or intermediate, we didn't have the number
4 of bacteremias within the penicillin resistant
5 intermediate, and we didn't have data on the severity.
6 We were told of 14 severe in the intermediate, four
7 severe in the penicillin resistant group yesterday.
8 We didn't see an animal model looking, although I
9 assume it would be the same, of penicillin resistant
10 versus penicillin susceptible pneumococcus showing
11 equal efficacy with moxifloxacin.

12 So, whereas, based on pharmacodynamics I
13 would think it should work, I didn't think we had the
14 same body of literature, which is just what you said.

15 DR. NORDEN: I'm very comfortable with
16 that, and Barbara has helped me, but I think that if
17 we are not going to combine the studies, we are only
18 going to talk about pneumonia, I think then my vote is
19 much easier. I think eight isolates is not a lot, and
20 we don't have the other information that we did have
21 yesterday in terms of severity of bacteremia and so
22 on, so I'm comfortable voting no.

23 I think that Dr. Goldberger's question is
24 a legitimate one, though, about pooling for future and
25 for, you know, other products or this product.

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1 ACTING CHAIRMAN RELLER: The question we
2 are addressing now is the database for strains that
3 are less than fully susceptible to penicillin for
4 community acquired pneumonia.

5 DR. NORDEN: I'll stay with the no vote.

6 ACTING CHAIRMAN RELLER: And, this is for
7 intermediate and fully resistant strains.

a DR. MURRAY Right, and I would agree with
9 that also, and as far as pooling, I certainly would
10 never pool efficacy from acute exacerbation of
11 chronic bronchitis, and I would be somewhat reluctant
12 to pool sinusitis efficacy with community acquired
13 pneumococcal also.

14 DR. GOLDBERGER Yes, we weren't really
15 thinking in terms, frankly, of acute exacerbation of
16 chronic bronchitis.

17 ACTING CHAIRMAN RELLER: Dr. Archer, we
18 are combining --

19 DR. ARCHER: Let me just say, since I was
20 recused from yesterday afternoon's discussion, I
21 abstain on this vote.

22 ACTING CHAIRMAN RELLER: Okay.

23 Dr. Parsonnet.

24 DR. PARSONNET: I agree with everything
25 Dr. Murray has said. I don't think that there is

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1 evidence, enough evidence, but I think from a
2 physiologic perspective it's likely that it will work,
3 so I would encourage the sponsor to collect more
4 information.

5 I also think we can't really add the
6 sinusitis in, since most sinusitis would clear up
7 whatever you gave them. So, I think we really have to
8 go with the pneumonia and have enough isolates of that
9 particular category.

10 ACTING CHAIRMAN RELLER: I think the
11 numbers are far too small to be comfortable with these
12 strains, particularly, relative to the numbers shown
13 yesterday, and even then I did not -- I favored having
14 the data presented for what they were, and not a
15 specific labeling after *Streptococcus pneumoniae*
16 regarding the susceptibility or lack thereof to
17 another agent, which, in fact, in what was presented,
18 and especially in the very small numbers of bacteremic
19 patients at least is efficacious, so that we don't
20 have a label that says, you know, amoxicillin,
21 including penicillin intermediate and penicillin
22 resistant strains, for which there is certainly just
23 as much data. And, consequently, I do not think this
24 should be included.

25 DR. DANNER: I agree, I also vote no on

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1 this issue. We are going to cover the issue of cases
2 of bacteremia and severity as a separate issue?

3 ACTING CHAIRMAN RELLER: We can address
4 that, but if we say there isn't sufficient information
5 then, I mean, it may be -- you know, may come up again
6 later.

7 But, I mean, we can, if you want to
8 comment on that, please do so -- I mean, it's
9 appropriate to do so now.

10 DR. DANNER: In addition to thinking
11 there's not enough information on penicillin resistant
12 isolates, I also think there's not enough information
13 on patients with bacteremia, or looking at data
14 showing us that in a category of severe pneumonia that
15 the drug is effective.

16 ACTING CHAIRMAN RELLER: Dr. Soper.

17 DR. SOPER: No for the penicillin
18 resistant issue.

19 ACTING CHAIRMAN RELLER: Dr. Christie.

20 DR. CHRISTIE-SAMUELS: No. I cannot
21 recommend including PRSP, nor should we mention PISP.
22 I think the numbers are too small for that.

23 In addition, I go back, and I still say
24 that seven out of ten patients who got better with 70
25 percent, it was bacteremic Strep. pneumo., although

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1 that was sensitive, but I still think we need much
2 more information than that, because here you are
3 dealing with a patient who is likely to be
4 hospitalized and a patient that's likely to be more
5 sick.

6 The other caveat would be, again, I think
7 this drug, when it's approved, will be utilized in
8 children, and I think we really need to collect a lot
9 more data, and I outlined yesterday my concerns with
10 Strep. pneumo., necrotizing pneumonias, and pleural
11 empyemas among abscesses in children, I really think
12 we need to study that more. We need to be very
13 cautious if we utilize this drug in the pediatric
14 population for pneumonias.

15 ACTING CHAIRMAN RELLER: Thank you.

16 Dr. Rodvold.

17 MR. RODVOLD: I agree with Dr. Murray and
18 vote no on both indications. I think that some
19 supporting information on the pharmacokinetics, both
20 in models, it would have been helpful to add a little
21 bit here to kind of reassure people. And, I think
22 also that there's no concentrations, from what I
23 understand, in patients.

24 And, yesterday Ortho McNeil's presentation
25 had pharmacokinetic data in patients to kind of

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1 reassure you, and you kind of wonder with this
2 bacteremia number being different here, so I think in
3 post marketing they may need to do a population
4 analysis and get some numbers to see if the PK is the
5 same, and that may be helpful also in the safety
6 issues, and see what the concentrations in those
7 patients are.

8 So, no, on the penicillin.

9 ACTING CHAIRMAN RELLER: Thanks.

10 Dr. O'Fallon.

11 DR. O'FALLON: No, on the penicillin, and
12 bacteremia, no.

13 Can I say, I'd like to make one more, I'd
14 like to match the screw up a little. One of the
15 things that bothered me yesterday about the discussion
16 was the fact that there were so few patients, and
17 that's bad from a statistician's point of view, but
18 the representativeness of those patients bothered me
19 a lot.

20 I kept listening to the pediatricians, and
21 I happened to be sitting between two of them, they
22 were very concerned about the fact that these things
23 are applying to children, without very much
24 information at all, because there are -- the studies
25 aren't being done in the kids. And so, when you have

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1 them -- they also said that a very large percentage of
2 the people that would be resistant, penicillin
3 resistant, would be kids.

4 And, it just bothers me, I think that
5 we've got to worry, not only about the total numbers
6 of cases in considering the indication for penicillin
7 resistance, but also the issue of who -- are those
8 cases representative in any way, shape or form of the
9 population that will actually be treated with it once
10 the approval is given?

11 ACTING CHAIRMAN RELLER: Thank you for
12 your comments.

13 What has come across very clearly is, and
14 it's interesting because clearly there have been many
15 discussions at these advisory committee meetings
16 having to do with the questions about safety in
17 children, but yet, the dilemma faced, you know, if
18 someone has concerns about safety because of one issue
19 then there aren't going to be the studies, but, yet,
20 we hear over and over again that these compounds are
21 used off label. And, that's something that, you know,
22 will have to be somehow dealt with, because there are
23 no indications for using these drugs for some of the
24 very things that we keep hearing they are being used
25 for, and that's why we need data, but they aren't

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1 approved for using, and, therefore, I mean, it's a
2 dilemma.

3 I don't want to get bogged down in this,
4 but, Mark, whatever you want to say.

5 DR. GOLDBERGER: No, I'll just make a
6 quick comment, as many of you know, Congress passed,
7 not that long ago, a provision adding six months of
8 exclusivity to either patent, orphan exclusivity or
9 other types of exclusivity for companies in return,
10 for instance, for performing pediatric studies.

11 You are all aware of the concerns that
12 have existed in using the fluoroquinolones in
13 children. Nonetheless, as more information has become
14 available, we have been working with a number of the
15 manufacturers about getting studies designed that
16 would, (a) provide the kind of information everyone
17 would like about both efficacy, short and longer term
18 safety in children, and would hopefully help some of
19 these manufacturers gain such exclusivity.

20 So, over the next months to a year or so,
21 you will be seeing more information about a variety of
22 studies that will become available with some of the
23 fluoroquinolones to assess different diseases in the
24 pediatric population.

25 ACTING CHAIRMAN RELLER: I think we're now

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1 ready to move to question two.

2 We do have yes for all of the above
3 indications, excluding the penicillin intermediate and
4 resistant strains of Streptococcus pneumoniae in
5 community acquired pneumonia. What labeling regarding
6 QT interval produced by moxifloxacin is adequate? Is
7 what has been suggested acceptable, or been proposed,
8 and, if not, how would you change it?

9 Dr. Norden.

10 DR. NORDEN: It's not adequate, and I
11 would suggest as a very simple and practical way of
12 doing this, that we ask Dr. Ruskin, who stated, I
13 thought, very nicely several points that should be
14 included in the label, and I think this is really
15 something where an experienced cardiologist could do
16 far better than a committee of ID docs.

17 ACTING CHAIRMANRELLER: Could we possibly
18 get the gist of it, realizing that this will be word
19 smithed and refined by the agency as an alternative --
20 potential alternative labeling, that then we could
21 make it more efficient to go around and see whether we
22 like one or the other?

23 DR. GOLDBERGER: One just -- perhaps, as
24 part of this, you had, you know, separated out the
25 efficacy and safety vote, and the question came up as

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1 to how you wanted to handle the issue of safety in
2 terms of any voting, and I don't know whether you want
3 to roll that over into discussion with question two as
4 well. You know, we obviously defer to your discretion
5 as to how to do that.

6 ACTING CHAIRMAN RELLER: I, perhaps,
7 wasn't clear enough. I thought I already rolled it
8 over into number two.

9 DR. CHRISTIE-SAMUELS: Excuse me, are we
10 going to vote on safety or are we going to discuss it?
11 I'm not clear.

12 ACTING CHAIRMAN RELLER: Okay. I think
13 the most efficient way to do this is, are the data
14 sufficient to have an unfettered, unadorned
15 endorsement of safety for all of the above indications
16 with this compound, yes or no? And, basically, what
17 that implies to me is that, you know, there's no
18 specific addressing of any changes or warnings with
19 regard to QTc or any other specific safety issue.

20 Or, put another way - well, is this drug
21 safe for all those indications or not?

22 Carl.

23 DR. NORDEN: No, I think it's safe, but I
24 think it needs a warning label, and I think -- I mean,
25 I would vote for its approval, if I were voting on

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1 that specifically, but I would still like the label to
2 be rewritten and I reiterate my original suggestion.

3 ACTING CHAIRMAN RELLER: Dr. Murray.

4 DR. MURRAY: I agree with what Carl said.

5 DR. ARCHER: Me, too.

6 DR. PARSONNET: Yeah, I agree with that as
7 well.

8 ACTING CHAIRMAN RELLER: Aye.

9 DR. DANNER: I'm going to say no, and I'm
10 going to say no because of the following reasons. I
11 think when the drug is marketed, no matter what kind
12 of warning you put in it, it's going to be used in
13 substantially different ways than it's been used in
14 the trials. And, I think that this is exactly the
15 kind of place that you get into trouble with, when a
16 drug is approved, it's carefully studied in a trial,
17 people are carefully excluded who have prolonged QT
18 intervals, are carefully excluded who are on drugs
19 that can be additive with it in terms of the effect,
20 and it's used for a very short interval of time, and
21 so it's not clear -- I am absolutely convinced that
22 the drug will be used differently once it's marketed
23 frequently.

24 And, I think there are enough things that
25 really haven't been answered. I don't know if the

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1 drug effects potassium and magnesium excretion, and
2 whether it somehow is additive with other drugs that
3 produces increased loss of electrolytes through the
4 kidneys, because that has not been looked at. It
5 seems to possibly cause or increase the incidence of
6 atrial fibrillation, and we don't have real drug
7 levels from real patients correlated with QT times.

8 So, I don't know, I'm just somewhat
9 concerned.

10 The other issue with safety, obviously, is
11 the risk benefit ratio, and I'm not sure I see what
12 this drug adds to drugs that we already have that's so
13 unique that we need this drug, that we absolutely need
14 it, and we need it now for some indication. There are
15 other drugs that you can use. They may have the same
16 problem, but given that they haven't been studied in
17 this way, I don't know that's the case.

18 ACTING CHAIRMAN RELLER: Thank you, Dr.
19 Danner.

20 Dr. Soper.

21 DR. SOPER: I believe the drug is safe,
22 and with the following comments. And, that is, I've
23 had the benefit of a crash course in QT intervals, and
24 my take home on this subject is that there's normal
25 variability throughout the population, that this delta

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1 of greater than 20 does not really reliably predict
2 any adverse cardiac events, and that it's not
3 quantifiable, so that the real risk with any of this
4 data, literally, is unknown, that there are other
5 drugs that have a similar, if not a more profound
6 effect, that have already been approved and are in
7 widespread use in this country, and that given the
8 lack of information that we have, and the state of the
9 art, where we are today, I think I would recommend we
10 approve the drug as safe and effective, and then, as
11 has already been alluded to, use Dr. Ruskin's
12 recommendations with respect to safety issues until we
13 get better data.

14 Thank you.

15 ACTING CHAIRMAN RELLER: Thanks.

16 Dr. Christie.

17 DR. CHRISTIE-SAMUELS: Well, I guess I'd
18 have to say no, the data on safety are not convincing.
19 It seems to me, based on the discussion, that the QT
20 facts are clinically relevant, steady state
21 concentrations needs to be studied further. In
22 addition, the concern about people using the drug for
23 longer than 12 days, I don't think we have enough
24 information on that, and I believe that that may
25 occur, even though that probably would not necessarily

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1 be what we would recommend.

2 The other concerns about other drugs that
3 might prolong the QT interval, the problems with
4 hypokalemia, the problems with death after the drug
5 was discontinued, and, again, the age-old problem, the
6 use of this drug in children, I think we need to study
7 the drug and the pharmacokinetics, and we also need to
8 study the safety in the pediatric population. We need
9 data on that, because although it was not studied, and
10 although it won't **be** approved for children, I'm afraid
11 it will be used in this population and I'm concerned
12 about that.

13 ACTING CHAIRMAN RELLER: Keith.

14 DR. RODVOLD: I'd approve it for safety
15 with the word smithing that it's going to be needed
16 for the QT. The other thing, although we also need to
17 be considering the label on that, prescribers realize
18 that they probably shouldn't exceed this dose
19 currently, because we just don't know what it is, **and**
20 they've got to stay in the box of the dosing that they
21 are recommending, and we **may** need to remind them that
22 they can do whatever they want post marketing, but I
23 think it's important to emphasize that to them as
24 well.

25 ACTING CHAIRMAN RELLER: Dr. O'Fallon.

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1 DR. O'FALLON: I was prepared to vote for
2 safety with an appropriate change in the label, but
3 the two that have talked about all the things that we
4 don't know about, you know, the behavior of this drug
5 have swayed me. I think I shall have to vote against,
6 I don't believe we know enough yet about the safety
7 because of the cardiac problems.

8 ACTING CHAIRMAN RELLER: Thank you.

9 Now, a greater exposition of question two,
10 I think, Dr. Ruskin, that many of the members are
11 looking to you for guidance for an alternative warning
12 label to be considered contrasted to what has been
13 proposed by the sponsor.

14 Yes.

15 DR. KWEDER: Dr. Reller, while it
16 certainly isn't a part of an official vote, could we
17 hear on the safety issue from the three consultants as
18 well?

19 ACTING CHAIRMANRELLER: Oh, please, sure,
20 with your request, yes.

21 Dr. Bartinelli.

22 DR. BATTINELLI: Yes, I would say that the
23 information provided, the drug is safe, and certainly
24 **as** safe as a number of other drugs approved, with the
25 exception that it needs a more careful labeling with

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1 respect to the QTc.

2 And, I agree with some comments that this
3 drug, as well as all drugs that are on the market,
4 will be used differently than they are actually
5 labeled for. However, I believe that the only piece
6 of information that the average clinician has to go on
7 is, in fact, the warning label, which is very
8 important and I think does bear more weight than some
9 have given credit for.

10 ACTING CHAIRMAN RELLER: Dr. Ruskin.

11 DR. RUSKIN: I would vote yes on safety,
12 with the caveat that labeling be very cautious, and
13 that the sponsor buy in to participating in very
14 careful post-marketing surveillance.

15 ACTING CHAIRMAN RELLER: Dr. Platt.

16 DR. PLATT: I was -- I thought Dr.
17 Danner's summary captured a lot of my concerns, and I
18 think that on balance we don't know enough now to
19 conclude that it's safe.

20 I think the other thing that gives me
21 pause is the fact that this is a drug that may be very
22 widely used, so even if the estimates of one to two
23 percent, which I think are very conservative, of
24 meaningful QT prolongations are correct, that might be
25 tens or hundreds of thousands of people who would

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experience those. So, it seems to me that knowing more would be necessary for me to say yes, so I think if I had a vote I would probably say no for now.

ACTING CHAIRMAN RELLER: And finally, I'd like to make sure that there are no other comments that the voting members of the committee would like to make.

Dr. Parsonnet.

DR. PARSONNET: I just have one comment, which also echoes a little bit what Dr. Danner said, which is that although I think this drug is safe, I think we also have to consider the other drugs, other antibiotics that are out there, and whether the risk benefit ratio is as good as other comparators or similar drugs that are there. And, I think in balance this probably doesn't add a terrible -- it doesn't add very much to the antibiotic armamentarium that we currently have.

ACTING CHAIRMAN RELLER: A part of -- if necessary, we could vote on the proposed QT labeling, but it's my sense, from hearing all the discussion, and I certainly would agree with it, that I'm not keen at all about the proposed QT labeling as proposed by the sponsor, partly because there is wording about patients that we have little or no information

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whatsoever, and other comments that have come out. And, consequently, for expediency I would like to hear the kinds of language that would go into, and if it would be in the form at your recommendation, and then we will have the voting members consider it.

Dr. Ruskin, would you put this in a warning label, and, if so, I mean of that degree of emphasis, and what would be the things that you would think important to include if you thought or if you would recommend a warning label?

DR. RUSKIN: Well, I was hoping not to get put in that position, but since you've asked the question directly I'll answer. I would include a warning label, and in saying that I guess I would also probably be inclined to urge that that be considered for other agents with similar effects, as we live through with the anti-arrhythmics, and that obviously the FDA will do a better job than I can with this, but to take a first pass at it, I guess it would say something to the effect that this drug is an Ikr blocker, or a weak Ikr blocker with a mild to moderate effect on the QT interval, that in the patient populations studied in the clinical trials no adverse effect on cardiovascular morbidity or total mortality was observed.

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1 However, there are no data on safety in
2 patients with preexisting QT prolongation or those
3 currently taking other agents which prolong the QT
4 interval and, therefore, the drug should be avoided in
5 those subsets.

6 Furthermore, factors such as bradycardia
7 or hypokalemia, which are known to exacerbate the QT
8 prolonging effects of Ikr blockers, should be
9 considered or approached with caution when using this
10 drug in patients susceptible to those conditions.

11 Something along those lines.

12 ACTING CHAIRMAN RELLER: We'll go from my
13 left around.

14 Dr. Kweder.

15 DR. KWEDER: As a follow on to that and,
16 perhaps, something else the committee could consider
17 in thinking about language, one of the tools that we
18 have employed with increasing frequency is the
19 requirement for a patient package insert with a drug,
20 particularly, for those that are going to be
21 administered in an out-patient setting. I wonder how
22 Dr. Ruskin would comment on the appropriateness of
23 that in the case of this drug.

24 DR. RUSKIN: I think it's a great idea.

25 ACTING CHAIRMAN RELLER: So that we have

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1 something to work with and people can disagree and we
2 can come back and make substantive revisions, do you
3 want to include that as part of the warning package?

4 DR. RUSKIN: Yes.

5 ACTING CHAIRMAN RELLER: Now, we'll come
6 to the committee members, and is what is described,
7 both the general wording, as well as the patient
8 information component, does that satisfy your concerns
9 about safety of this drug for the moment?

10 DR. NORDEN: Yes.

11 ACTING CHAIRMAN RELLER: Dr. Murray.

12 DR. MURRAY: Yes.

13 DR. ARCHER: Yes.

14 DR. PARSONNET: Yes. I have, actually, an
15 FDA question, which is, when we put this warning label
16 on this particular drug, what happens to the drugs
17 that it interacts with? Do you then add it to the
18 list of drugs on those warning labels, so that when
19 somebody is on this medication and three days later
20 their doctor says, well, you now have atrial
21 fibrillation, we are going to put you on an anti-
22 arrhythmic, is it going to be in that anti-
23 arrhythmic's description label that says being on --
24 previously being placed on this antibiotic is a
25 contraindication?

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1 DR. KWEDER: That's a challenge, and we
2 try to deal with that as best we can. I mean, it gets
3 to the point where some of these drugs have exhaustive
4 lists of potential drug interactions, and as we go
5 along we do try to update them as best we can.

6 It certainly does offer a particular
7 challenge when you are dealing with drugs that are for
8 totally different indications, like an anti-arrhythmic
9 and an antibiotic, but we will attempt to do that.

10 DR. PARSONNET: Because it is quite
11 conceivable that somebody will be on this drug first
12 and have something else added on.

13 DR. KWEDER: Absolutely.

14 DR. PARSONNET: And then, if it's not in
15 the label for that particular medication it may be
16 missed.

17 DR. KWEDER: Right.

18 ACTING CHAIRMAN RELLER: Thank you both.

19 Bob.

20 DR. DANNER: I'm a little confused by what
21 we are voting on. I mean, my answer is still no from
22 before. I agree that if the drug is approved that it
23 has to have a warning label similar to what's been
24 described. I also wonder whether it shouldn't include
25 something about the possibility that it may induce

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1 atrial fibrillation in patients, particularly,
2 patients at high risk for that arrhythmia. And, you
3 know, whether it should contain information about the
4 drug effect on QT may be aggravated by hypokalemia
5 and, therefore, potassium levels, particularly, on
6 patients who are on drugs that cause hypokalemia
7 should be monitored, or at least baseline checked.

8 I mean, I think there may be other things
9 that need to go into the warning label to caution
10 people.

11 I would also suggest that it say something
12 about the fact that in the trials prolonged use of the
13 drug, in terms of its cardiovascular safety, were not
14 assessed, you know, by giving it longer than stated.

15 You know, in terms of the other drugs that
16 have been approved, I guess one of the problems that
17 the pharmaceutical company has here is that, you know,
18 they were, perhaps, the first to come along, take a
19 drug with this issue and evaluate it so thoroughly, so
20 it's probably, you know, raised **as** many questions as
21 it has answered.

22 In the other drugs that have gotten
23 approval, where a number of thousands of people have
24 been studied, I guess I'm not sure in all of those
25 that people on Class 1A and Class 3 antiarrhythmics

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1 were excluded. So, in fact, if they studied those
2 types of patients and didn't have an increase in
3 problems, that would suggest that, perhaps, those
4 drugs may, in fact, be relatively safer than we know
5 this drug is, just because it hasn't been looked at in
6 those populations. I don't know the answer to that.

7 ACTING CHAIRMAN RELLER: Dr. Danner, thank
8 you for your comments, all of which are recorded here
9 for consideration, and we'll come back to some of
10 these issues on the last question, I think, as well.

11 Dr. Soper.

12 DR. SOPER: Yes, with the warning label as
13 discussed.

14 ACTING CHAIRMAN RELLER: Dr. Christie.

15 DR. CHRISTIE-SAMUELS: Yes, with the
16 warning label as discussed, and I guess we would also
17 say that it has not been approved for use in children.

18 ACTING CHAIRMAN RELLER: Thank you.

19 Keith.

20 DR. RODVOLD: Yes. As I mentioned before,
21 and in view of what Bob just said, I'd put a dose
22 duration, reemphasize that this data is around only
23 this information at this time, and we don't know what
24 it is outside of that, so just a friendly reminder of
25 this dose and duration that's been studied.

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1 ACTING CHAIRMAN RELLER: Dr. O'Fallon.

2 DR. O'FALLON: Yes, with the various -- I
3 would vote for all the amendments that have been
4 suggested.

5 ACTING CHAIRMAN RELLER: And, I also, for
6 the record.

7 Question three, if moxilactamis approved,
8 what -- I thought we needed some comic relief at this
9 time of the day -- how's that for a recovery -- okay,
10 now question three, if moxilactam -- could you read
11 the question, Julie? No. If moxifloxacin is
12 approved, do you have any recommendations regarding
13 Phase IV studies for data collection that the
14 applicant should be requested to perform?

15 Carl, what studies data to you want to
16 see?

17 DR. NORDEN: Well, I think the one I would
18 most like to see is the one that Keith mentioned, and
19 I think all of us were asking about, and that is PK
20 data, concentrations in patients, not just in healthy
21 volunteers, because I'd really like to know whether
22 this is the same, or as I suspect it will be different
23 for sick patients, as opposed to healthy volunteers.
24 I think that would be very useful.

25 ACTING CHAIRMAN RELLER: Barbara.

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1 DR. MURRAY: Studies such as we heard
2 yesterday focusing on pneumococcal pneumonia,
3 penicillin resistant susceptible strains, if the
4 desire is to get that as an adjunct or a supplement to
5 the labeling.

6 DR. ARCHER: I think prospective studies
7 looking at -- continue looking at QT prolongation with
8 this and similar compounds, but this one, since so
9 much data has already been collected, to look at data
10 in patients where applicable, and interactions with
11 other drugs that might be pro-arrhythmics.

12 DR. PARSONNET: I agree with all those
13 studies. I would be interested in knowing whether
14 people actually follow the warning labels and whether
15 they actually adhere to what is recommended, and
16 whether there's a way to access that data. And, I'm
17 also just very curious about this AF phenomenon, and
18 although I wouldn't -- I don't think it's necessary to
19 include that in the warning label, I would be
20 interested in seeing whether there's any animal
21 information that could be obtained about that, and I
22 would certainly want that to be included as one of the
23 things they followed up to see whether it occurred
24 with greater frequency in follow-up studies.

25 ACTING CHAIRMAN RELLER: Dr. Danner.

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1 DR. DANNER: Well, I agree with all of
2 that, in terms of the further studies and monitoring,
3 and I would like to see more data in bacteremia in
4 patients with very severe illness due to pneumonia,
5 such as patients requiring intensive care units, and
6 I'd like to see information on whether the drug has an
7 effect on potassium or magnesium excretion, whether
8 those -- and whether those effects are added are
9 synergistic with other drugs that have that effect.

10 ACTING CHAIRMAN RELLER: Dr. Soper.

11 DR. SOPER: I have nothing to add.

12 ACTING CHAIRMAN RELLER: Dr. Christie?

13 DR. CHRISTIE-SAMUELS: I'd be interested
14 to learn more about the QT factor at relevant steady
15 state concentrations, as discussed previously. I'd
16 love to hear more about how the drug performs in
17 patients with bacteremic pneumonia, not only
18 penicillin susceptible strains, but penicillin
19 resistant strains as well. I'd also like to learn
20 more about the drug performance in patients who have
21 community acquired pneumonia with pneumococcal
22 isolates. I'd love to learn more about the drug in
23 children, the pharmacokinetics, efficacy studies,
24 especially in patients who have pneumonia, again,
25 stressing what I said yesterday.

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1 ACTING CHAIRMAN RELLER:

2 DR. RODVOLD: I'll go ahead, Barth, and I
3 agree with what has been said. In regards, I'd urge
4 sponsors to pursue the penicillin resistant indication
5 if they wish, but I'd also encourage them to use
6 studies that would be a little bit more helpful, maybe
7 more domestic studies, controlled studies, blinded
8 randomized, so that we are not kind of sitting on the
9 edge of knowing what's going on, and so that when they
10 present the data that it comes across more convincing,
11 and the numbers would be up in -- and I think they can
12 do that all post marketing, in addition to the safety
13 hopefully, and they might be able to get by with a
14 couple of good controlled studies and be back on the
15 table within a year or two, or whatever it's going to
16 take, and try to combine as much of that as possible
17 for us to get it all clinically relevant.

18 ACTING CHAIRMAN RELLER: Judith?

19 DR. O'FALLON: I agree.

20 ACTING CHAIRMAN RELLER: I think it was
21 mentioned earlier that it would be difficult and would
22 need some courage in requiring close observation, but
23 I think Dr. Ruskin pointed out earlier that if - Dr.
24 Temple -- that if studies were undertaken in what
25 people had the greatest concerns about of

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1 interactions, and a controlled situation to delineate
2 that, to see whether these are competing for the same
3 receptor mechanism or, in fact, are additive and get
4 up to a magnitude that poses a risk would be helpful
5 in the long run.

6 Question four.

7 DR. GOLDBERGER: Dr. Reller, can I just
8 ask Dr. Ruskin whether there are any other specific
9 studies he might want to suggest that might better
10 elucidate some of the issues as far as the risk of the
11 QT prolongation, either clinical or preclinical.

12 DR. RUSKIN: No, I think they've been
13 pretty well covered. I guess the one drug that would
14 interest me, just because of its extraordinarily
15 widespread use, would be an interaction study with
16 cisapride, but other than that I think all of them
17 have been covered.

18 ACTING CHAIRMAN RELLER: Dr.s Battinelli
19 and Platt, do you have anything you want to add here?

20 DR. PLATT: One additional thing that I
21 think would be worth knowing is the impact of
22 moxifloxacin therapy on acquisition of resistance by
23 pneumococci, and that might be learned by doing nasal
24 swab surveillance for pneumococci after therapy, even
25 though it's not the organism being treated,

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1 understanding whether this change in MIC would be
2 fairly helpful.

3 DR. BATTINELLI: I would just add that in
4 addition to cisapride, some of the other drugs that a
5 number of patients are on, that the usual family
6 practitioner, internist or other person prescribing
7 this agent, doesn't know a lot about all the anti-
8 psychotics, and frequently patients are on those
9 medications and don't report being on those
10 medications, so I would also study those as well.

11 ACTING CHAIRMAN RELLER: These comments
12 reminded me of something that I also would be
13 interested in, and I realize it may be difficult to
14 obtain, and that is, there were very few clinical
15 failures in the patients with pneumococcal pneumonia,
16 but when there were failures either we don't have or
17 the patients weren't cultured, and I think it would be
18 those patients that we'd be particularly interested in
19 finding out whether the organism that persisted, if
20 there be any, is markedly different in its
21 susceptibility to this or any of the newer compounds.

22 Question four, do we have any
23 recommendations regarding the parameters, both
24 qualitative and quantitative, that might be most
25 useful in assessing the significance of QT

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1 prolongation caused by anti-infective products, and
2 I'd like here to actually begin with our consultants,
3 and just for consistency we can go to Dr. Battinelli
4 and then to Dr. Ruskin and around for the voting
5 members.

6 DR. BATTINELLI: I think some of these
7 things have already been mentioned, that most
8 interested in making sure that there's good data on
9 concomitant drug use. I think the sponsor has
10 established the rigorous protocol by which prospective
11 or potential patients who are normals, et cetera, are
12 studied, but not enough data on people taking the
13 additional medications.

14 DR. RUSKIN: I think we've hammered this
15 pretty hard today, and I guess I would start by saying
16 that what Bayer has done might serve as a model for
17 working up a drug that affects the QT interval. This
18 is really a lovely evaluation all the way from the
19 preclinical through the clinical.

20 The important issue is, if you see a
21 signal of an effect on a QT, to go back and do an Ikr
22 screen, and then to look at single cells, usually
23 guinea pig myocytes and hyperkinetic tissue, isolated
24 perfused rabbit hearts, intact dog hearts, for a whole
25 host of parameters, so that you look at a number of

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1 different models, one over a very wide range of drug
2 concentrations and heart rates, be very careful to
3 screen for metabolites and make sure that the clinical
4 data are collected in a very careful and rigorous way,
5 as detailed by Dr. Morganroth.

6 So, I think it really is a package, and I
7 would have to say that this is certainly among the
8 best of them that I've seen. So, if FDA is looking
9 for guidance, this is probably a very good place to
10 start **as** a model.

11 DR. GOLDBERGER: You know, it wouldn't be
12 uncommon to have potentially some of the preclinical
13 data done first, or very early on, certainly before
14 the Phase III trials. Does the preclinical data, if
15 a negative result occurs in that, is that sufficient
16 even if you were worried because of the class of drugs
17 to not have to do a lot in the Phase III trials, or
18 are you basically saying that both preclinical and
19 clinical data should always be obtained if there's any
20 type of signal or suspicion?

21 DR. RUSKIN: I think the preclinical data
22 is critical, and most of the experience would suggest
23 that if the drug doesn't affect Ikr that you are
24 probably pretty safe. So, that's really the place to
25 start.

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1 If the drug has Ikr blocking properties,
2 then I think it opens Pandora's Box in terms of having
3 to run the gamut. I don't know how --

4 DR. GOLDBERGER: So, you would think
5 that's a reasonable screening test?

6 DR. RUSKIN: Well, I think it's a very
7 good place to start. The likelihood of having a
8 significant clinical problem if you don't effect human
9 Ikr is pretty minuscule.

10 ACTING CHAIRMAN RELLER: Dr. Temple.

11 DR. TEMPLE: We are actually actively
12 looking at that. There's a lot of data on a lot of
13 drugs, and there may be a difference, we don't know
14 this for sure yet, it depends on what the
15 concentration that inhibits the Ikr is. Our dream,
16 our hope, is that you can find a cutoff point above
17 which you are not worried, because the concentration
18 needed is so large, and there's at least some sense
19 that it is breaking down that way, where the receptor
20 is very sensitive, you have the class of drugs that
21 cause trouble where it's hardly sensitive at all, and
22 you need a very large concentration to inhibit, those
23 look more or less clean, and in the middle you have to
24 do a lot of work.

25 DR. GOLDBERGER: Dr. Reller, could we also

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1 hear as part of this from Dr. Morganroth?

2 ACTING CHAIRMAN RELLER: Sure.

3 DR. GOLDBERGER: Okay.

4 DR. MORGANROTH: My only addition to it
5 was just said, is that I'd be very cautious to assume
6 that Ikr data is simple, you know, black and white,
7 like getting a serum potassium is. As heard, it's
8 concentration dependent, model dependent, in whose
9 hands it is. So, if you are about to start a new drug
10 and you set up the model in your lab in your company
11 and you find it to be negative, you know, that would
12 make me very comfortable.

13 But, as Jeremy said, if you do it in a
14 bunch of models and in a bunch of concentrations, et
15 cetera, and you really work it up well and it's
16 negative, I still think that like doing liver function
17 tests is an analogy, if you screen toxicologically and
18 you don't think a drug affects the liver, how many of
19 you would be comfortable going into a clinical drug
20 development program and not obtaining in man liver
21 function tests? I mean, you wouldn't even raise that
22 question, of course you would do that.

23 In the past, we've not done
24 electrocardiograms on every single drug ever taken
25 into man in the non-cardiac field, because they don't

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1 affect the heart, they are non-cardiac. But, we've
2 now learned that so many drugs appear to affect the QT
3 interval that were unexpected that I simplistically
4 would suggest that the EKG, just like grabbing, you
5 know, 'the CBC in a chemistry panel, it's not
6 irrational to include EKGs with every -- as a simple
7 point of safety. When do you do that? Well, you
8 don't do it before the drug is given, you know, and
9 then after the drug is given, when would you do your
10 CBC, liver function tests, you would do it during at
11 least acute dosing, and then you would also want
12 chronic exposure. And, I think EKGs belong before,
13 during acute exposure, and afterwards, and I think
14 they should be centralized like most blood studies,
15 and I think they have to be analyzed with the attempt
16 to try to find three, six, ten milliseconds, rather
17 than by eyeball where there's a lot of noise.

18 So, my answer to number four is, you do
19 need preclinical, you do need clinical. The
20 preclinical only tells you what your risks are, and
21 you may, even with a positive Ikr because of
22 therapeutic benefit, go into man, but on the other
23 hand if you are not so sure of the benefit risk you
24 may pick another drug in that sequence or not move
25 into man because of the risks involved, and that when

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1 you do it, and how you do it, should be very similar
2 to any other safety test that you do and making this
3 very simple.

4 ACTING CHAIRMAN RELLER: Dr. O'Fallon.

5 DR. O'FALLON: Now, is the question, do
6 you have any recommendations, et cetera, with these
7 recommendations, is that the --

8 ACTING CHAIRMAN RELLER: Do you have
9 anything to add in addition to what's already been
10 said?

11 DR. O'FALLON: No, I don't. Thank you.

12 ACTING CHAIRMAN RELLER: And, Dr. Platt,
13 I think I skipped over you when we diverted to Dr.
14 Morganroth, whose comments we much appreciate.

15 DR. PLATT: Well, I'll comment from an
16 epidemiologist's perspective, to **say** that often what
17 we -- another thing that is important to focus on is
18 the absolute level of risk, not the relative risk, so
19 that I think in the risk assessment for all drugs, and
20 this class of QT prolonging drugs as well, it's
21 important to contemplate in the target population
22 what's the number of people who are likely -- who
23 might plausibly be adversely affected, as opposed to
24 the percentage.

25 And, the other comment I'll make is that,

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1 among drug safety problems, this is, I think, among
2 the most difficult to tease out using traditional
3 post-marketing surveillance methods, that the system
4 that Dr. Brinker described, and some of the databases
5 that draw on large populations that are very useful
6 for understanding other kinds of adverse drug
7 reactions, are not very good for these kinds of
a reactions. And so, when there's a judgment to be
9 made, there's more emphasis that will have to be put
10 on the formal clinical evaluations.

11 ACTING CHAIRMAN RELLER: Thanks.

12 DR. RODVOLD: I have nothing to add.

13 DR. CHRISTIE-SAMUELS: I have nothing
14 further to add.

15 DR. SOPER: Nothing to add except to
16 amplify Dr. Platt's comments. I mean, I think that
17 absolute risk and predictive values of some of these
18 parameters that you are measuring with real patient
19 outcome is an important target, and all of the money
20 and work that goes into looking at measuring
21 something, if it's not predictive of poor outcome I'm
22 not sure it's worthwhile.

23 DR. DANNER: Nothing to add.

24 ACTING CHAIRMAN RELLER: Julie, Barbara.

25 Before they had to leave, Dr.s Archer and

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1 Norden affirmed, and I would like any comments from
2 the committee, and this is, Mark, for you and your
3 colleagues at FDA, and we can assume this would
4 happen, but I'd like for the voting members of the
5 committee to give a sense of their feeling of need for
6 it, and that is, as more has been learned and
7 discussed about this specific agent, we together,
8 Rhonda helped to just pull forth the package insert on
9 specifically sparfloxacin, grepafloxacin and
10 clarithromycin, and all of them have language
11 different from what has been proposed, but related to
12 the QTc issue.

13 And, I would think it would be wise for
14 fairness, for consistency, for understanding,
15 realizing that some of these compounds, while these
16 compounds were approved before we had the kind of
17 database that is available here, to whatever, within
18 the regulatory capabilities are possible, to go back
19 and look at some of the questions that have been
20 raised if the data are extant, including such things
21 as what Dr. Ruskin pointed out, were patients with
22 certain conditions excluded from the outset, so that
23 there are no data and that the risks and the comments
24 about the QTc intervals may be made on a patient
25 population that is different from the ones that have

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1 been discussed so thoroughly here today.

2 But, the essence of all of this is of
3 trying to get consistency, equity, fairness and
4 detecting real differences if there be them, which
5 there have been for other values, between the
6 compounds within a class and across classes that
7 relate to a particular kind of safety concern.

8 Dr. Murray, would you like to see that
9 happen?

10 DR. MURRAY: Yes.

11 ACTING CHAIRMAN RELLER: Dr. Parsonnet.

12 DR. PARSONNET: Sure.

13 DR. DANNER: Yes.

14 DR. SOPER: Yes.

15 DR. CHRISTIE-SAMUELS: Yes.

16 DR. RODVOLD: Of course.

17 ACTING CHAIRMAN RELLER: Okay.

18 DR. O'FALLON: Yes.

19 ACTING CHAIRMAN RELLER: Dr. Goldberger,
20 we have tried to address the questions you posed, and
21 a few additional ones, and have broken up, even added
22 a few compounds that you never wanted us to consider,
23 dropped quickly, or not so quickly, do you have any,
24 or Dr. Kweder, any concluding -- any comments that you
25 want to make? We are about to wrap this up.

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1 DR. GOLDBERGER: Yes, my only comment
2 would be to thank the committee and the consultants
3 for their comments and opinions, which I actually, I
4 think have been quite useful. I'd particularly like
5 to thank both Dr. Ruskin and actually Dr. Morganroth,
6 even though he came here with Bayer, for their
7 comments, which I think have helped a substantial
8 amount in terms of our, you know, thinking about a
9 possible framework for evaluating current and future
10 compounds.

11 ACTING CHAIRMAN RELLER: I'd like to thank
12 everyone's efforts to speak what they think and to do
13 it succinctly, and this Anti-Infective Advisory
14 Committee meeting is concluded.

15 (Whereupon, the meeting was concluded at
16 3:32 p.m.)

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CERTIFICATE

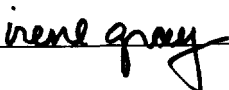
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Before: ANTI-INFECTIVE DRUGS ADVISORY COMMITTEE

Date: OCTOBER 21, 1999

Place: SILVER SPRING, MARYLAND

represents the full and complete proceedings of the
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